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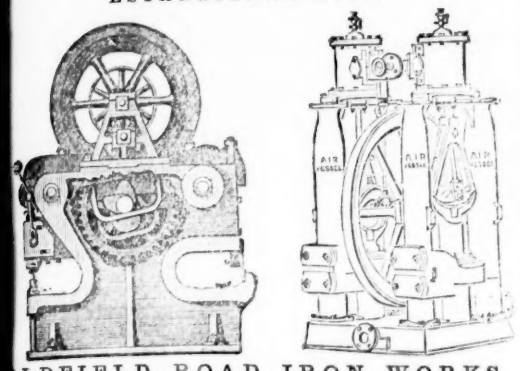

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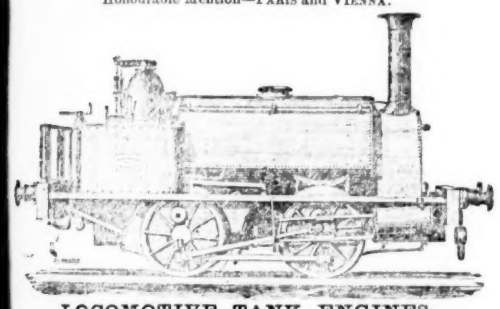

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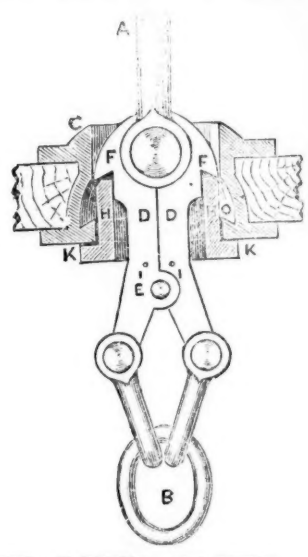

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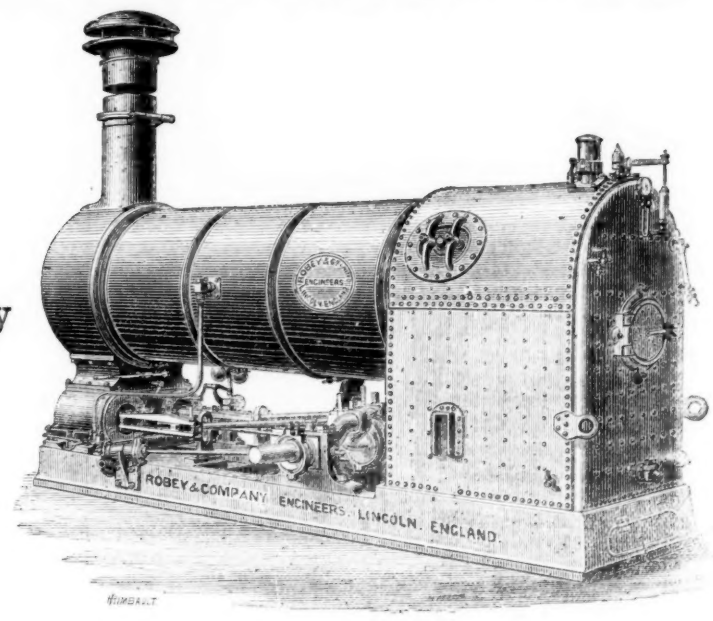

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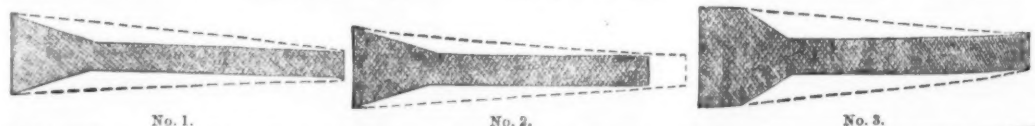

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THE IRON INDUSTRIES OF GLOUCESTERSHIRE, FOREST OF DEAN.

By RICHARD MEADE, Assistant Keeper of Mining Records, Museum of Practical Geology.

In Somersetshire, as in Gloucestershire, the ores of iron are more or less disseminated through the rocks of the district. Hitherto attention has been directed in a previous notice to the ferruginous deposits of the Forest of Dean and other localities in Gloucestershire. It is now proposed to consider generally those important deposits of iron ore occurring in Somersetshire, following with statements showing the production of the mines, and subsequently considering the character and composition of the ores in both counties.

The dolomitic conglomerate, reposing on the coal measures, and so called from its peculiar character, contains hematite iron deposits; the variable thickness, however, of this the middle division of the trias, rarely exceeding from 25 to 30 ft. in this area, has rendered mining operations somewhat uncertain, and hence the deposits have been developed but to a limited extent. The coal measures of the Gloucester and Somerset districts, consisting generally of a series of shales and sandstones, with seams of coal, and occasional measures of ironstone, may be taken in their average depth as having a thickness of not less than 5000 ft. These measures are divided into an upper and lower series, between which interposes an arenaceous rock, known as the Pennant Grit, consisting of thick beds of sandstone, varying in colour from grey to dark-red. These beds frequently alternate with thin shales, and occasionally a seam of coal interposes. The upper and lower coal measure series contain productive seams of coal, while some measures of ironstone are met with in the lower series. The Pennant Grit, however, is the principal division of the coal measures in which the hematite ores are met with, and in the neighbourhood of Bristol some of the localities in which these deposits have been wrought are situated at Frampton Cotterell, Iron Acton, and other places, for which returns of the produce of the mines will be found in a previous notice.

Again, in the millstone grit, at the base of the coal measures, beds or courses of iron ore are occasionally met with. The millstone grit, it may be stated, is familiarly known as the "Farewell Rock," due to the fact that when reached there is no longer any probability of reaching coal in depth. The millstone grit in Somersetshire and Gloucestershire has a varying thickness. In the Mendip Hills it does not exceed 500 ft., while in the Bristol and Gloucestershire area its average thickness may be taken as varying between 800 and 1000 ft.; it is composed of beds of sandstone, grit hard and close-grained, thin beds of sandy shale, with occasional seams of coal, and beds of conglomerate, containing quartz pebbles.

The carboniferous or mountain limestone upon which the millstone grit reposes is also a repository of the ores of iron wrought in this area; it is made up of numerous beds of grey and blue limestone, interstratified here and there with chert in bands and strings. These beds are traversed by joints, veins, and faults, in which are found the deposits of ore in irregular veins, pockets, and fissures. The true carboniferous limestone in this area has an average thickness of 3000 ft., and rests upon the lower limestone shales, the lowest member of the carboniferous system, having an average thickness of not less than 500 ft., and forming, as it were, a passage between the Old Red Sand-tone and the carboniferous limestone; it consists of shales and limestones, occasionally sandy and micaceous, varying in colour from blue to grey, and brown, while in the uppermost part are beds of tough bluish limestone. It may be convenient to note the succession of the rocks in the area above referred to, giving the average thickness in descending order, as follows:—

		Feet
TRIAS	Rhætic beds	50
	New Red Marl	300
	Dolomitic conglomerate	25
CARBONIFEROUS SYSTEM	Coal measures	5000
	Millstone grit	800
	Carboniferous limestone	3000
	Lower limestone shales	500
OLD RED SANDSTONE	Old Red Sandstone	4000

IRON ORE DEPOSITS OF THE BRENDON HILLS.—The district known as the Brendon Hills extends nearly east and west at about 6 miles south of that part of the coast in the Bristol Channel lying between Watchet and Minehead, and terminates in a deep valley near Eisen Hill, where deposits of iron ore also occur. The Brendon Hills rise boldly on the north side, but on the south side the decline is easier, and they merge into numerous small valleys and gentle elevations; the highest ground in this range of hills is about 1300 ft. above the level of the sea. The variety of iron ore occurring in the Brendon and Eisen Hills is that known as spathic, or carbonate of iron; it is also known as siderite, and forms an important ore and source of the metal.

These spathic ores are rich in manganese, and valuable for conversion into spiegeleisen; the only other deposits of this kind known to exist in this country are those of Weardale, in Durham, where the ore is associated with ores of lead and zinc, and at Exmoor, in North Devon, and Perran, in Cornwall. It has been observed that the upper portion of these deposits undergo change in their character and composition, due to atmospheric influence, being converted into brown hematite, or limonite.

The spathic ores of iron are found more abundantly on the Continent of Europe. In Siegen, on the Rhine, they are found occurring in rocks of Devonian age, extending over an area of 46 miles in length and 23 miles in width from north-east to south-west, in which area some 500 lodes are known to exist. There are also lodes containing red hematite and specular iron ore in the same district; their number, however, is more limited. The iron industries can be traced back for nearly a thousand years in the principality of Siegen, in Prussia, and mention is made as early as the year 1288 of a steel forge being in operation in the town of the above name. In Thuringia the ores of spathic carbonate are of considerable importance, occurring in rocks of Permian age. At the Stahlberg Mines the principal lode worked has a thickness of nearly 20 fms. In the year 1872 the production of the Stahlberg Mines was 700,000 tons of spathic ores, 170,000 tons of brown iron ore, and 36,000 tons of red hematite and specular iron ore.

In Lombardy, in the kingdom of Italy, the ores principally wrought are spathic carbonates and brown hematites, occurring in beds enclosed by metamorphic gneiss; in the neighbourhood of the lakes of Como and Iseo, and in the Val Sassina and Bergamask Mountains, they compose layers or seams, sometimes 2 and even 3 fathoms thick, in triassic red sandstone or green slate. Again, in Styria, in the Eastern Alps, spathic carbonate of iron exists in extensive deposits at Eisenerz, intercalated between beds of red sandstone and grauwacke, in rocks of Devonian age. The beds are of considerable thickness, and consist of carbonates and hydrated peroxides of iron, the latter being a production of the oxidation and weathering of the former.

As previously stated, the ferruginous deposits of the Brendon Hills occur in the Devonian rocks, composed of clay-slate. At the surface the clay-slate is of a greyish colour, but in depth it invariably acquires a blue or greenish colour. At a distance of 2 miles north of the most elevated part of the hills at Treborough this slate is quarried largely, and yields a good roofing material.

The ore wrought in the Brendon Hills may be generally referred to the following varieties—first, the "white ore," a spathose ore generally crystalline in character; secondly, a "red ore," consisting of decomposed spathose; and, thirdly, other varieties, known as "black ore," "brown ore," and "potty ore," composed of dark-brown ores, more or less cellular.

The above varieties occur in the form of pockets, which sometimes exist in close proximity to each other, admitting of their being worked from one mine. The term "lode," it should be observed, in this district is applied to any metalliferous part of a vein yielding ore to value, while the unproductive parts of the lode are said to be "dead;" again, when the sudden enlargement of a lode or pocket takes place it is designated a "bunch" of ore.

Numerous indications of old workings in the Brendon Hills point to the fact of their having been extensive explorations in ancient times; it is, however, within the last 20 years that they have been opened up on a large scale, growing from insignificant workings to important mines. They are the property of the Ebbw Vale Company, the ore raised from these mines being sent to the ironworks of the company in Monmouthshire. The most ancient workings appear at the eastern end of the Brendon Hills, known as the Colton pits, and were wrought horizontally of a zig-zag form; further to the east these old workings are again met with, clearly showing that the ancient miners selected localities in which the ore existed most abundantly; further to the west the Roman and Carew Mines occur, these have been in late years further explored and worked on a limited scale. Taking a westerly direction the Raleigh Cross Mine, situated and adjoining the Carnarvon Mine, with which it is connected by a heading; the first drift sunk on the lode at the Carnarvon Mine did not reveal a favourable condition, later, in 1866, a new drift was commenced, and the more productive part of the lode was opened. Other workings appear to the west, at the Burrow Mine, near Wiveliscombe; the ore here wrought is at times hard and red, and occasionally possesses a rich blue colour. The next workings are those at Florry Mine, where the ancient workings were found to have a depth of 30 ft., below which the lode appears to yield a hard red ore; again, in the Bearland Wood Mine, to the west, are found some extensive explorations, the lode yielding large quantities of soft red ore.

The Gupworthy Mine was the first opened in the Brendon Hills of which there is any account, and it appears to be the locality from which the first undecomposed spathose ore was obtained. Mr. Morgan Morgans, in his interesting and instructive paper on the Brendon Hills Spathose Iron Ores and Mines, read before the South Wales Institute of Mining Engineers, in 1868, and to which we are indebted for many of our facts, gives the following account of the history of the discovery which led to the existing mines in the Brendon Hills—"Many years ago a Mr. Tibbets from Cornwall, being convinced from the nature of the ground, old surface workings, and small mineral specimens found in the latter, that a copper lode existed below, began explorations by driving an adit at Gupworthy. This adit intersected the iron lode, which at this point—20 fms. deep—was very excellent, compact, and pure undecomposed spathose."

The district under consideration, some years later, engaged the attention of the late Mr. E. Rogers, of Abercarne, who was struck with the similarity of the continental ores and those raised at Gupworthy, a collection of which had previously been made and exhibited in the Great Exhibition of 1851; from this and other districts he subsequently more fully explored the deposits, ascertaining their extent and importance, and eventually transferred his interest to the Ebbw Vale Iron Company, who set to work vigorously and developed the deposits, a considerable portion of the lode of which had a thickness of 20 feet.

Kennesome Hill and Goosemoor Mines exhibit further explorations west in the Brendon Hills, beyond which ore has not hitherto been wrought to any great extent, until the Eisen Hill is reached, where, as previously stated, valuable pockets of ore occur.

PRODUCTION OF SPATHIC AND OTHER IRON ORES IN SOMERSETSHIRE.—The spathic ores of the Brendon Hills are now worked extensively, and have been for some years; as previously stated, the mines of the same name, and Eisen Hill, are the property of the Ebbw Vale Iron Company, who commenced operations on a small scale, but the workings are now of considerable extent, the ore raised at these mines being sent by railway to the coast, then shipped for Newport, and forwarded for reduction to the Ebbw Vale Works. The ore was originally obtained from the Carnarvon and Raleigh Cross Mines, and shipped from the district; but about the year 1864 a line of railway was constructed over the hills, from the top of the Brendon Hills to Gupworthy, giving increased facilities for sending ore out of the district. Iron ore was formerly raised at Yatton and Winford, and other places in the Mendip Hills, and was distributed by the Bristol and Exeter Railway for shipment to Bristol, Highbridge, and Bridgewater. The following statement shows the returns of the Somersetshire iron mines in each of the years named:—

Year.	Brendon Hills, &c.	Yatton. Hematite.	Winford. Hematite.	Bristol. Argillaceous.
1855	....Tons 4,840	—	—	—
1856	7,820	5000	1500	500
1857	9,642	6000	1200	750
1858	19,018	707	—	1200

Other mines in the year 1858 produced the following quantities—Honeymead, 500 tons; Ashton Vale, 2616 tons; and Ashton Hill, 2000 tons. In subsequent years the mines yielded the following quantities—

Year.	Brendon and Eisen. Tons.	Yatton. Tons.	Ashton Vale. Tons.	Ashton Hill. Tons.	Bristol. Tons.*
1859	23,143	1580	2,000	750	1507
1860	18,072	569	3,960	—	1500
1861	23,787	175	7,300	—	1500
1862	29,321	—	342	—	1750
1864	36,385	74	12,985†	—	3500
1865	29,468	—	2,720	635	2500
1868	27,925	—	2,760	—	1765
1870	14,603	—	2,051	2110	975
1872	27,913	—	—	2000	750
1874	38,316	—	—	962	500

* Argillaceous ores. † Including Ashton Hill returns.

The aggregate production of the Somersetshire mines, as detailed in the above returns, a few occasional parcels of iron ore being omitted, show the following totals and value in each of the years named:—

Year.	Quantities.	Value.	Year.	Quantities.	Value.
1855	..Tons 4,840	—	1864	..Tons 52,925	£26,868
1856	14,620	—	1866	35,323	17,661
1857	25,842	—	1868	32,450	12,168
1858	26,041	£13,020	1870	19,739	6,908
1859	29,083	14,501	1871	32,882	32,863
1860	24,101	12,450	1873	30,913	34,913
1861	32,763	16,381	1873	46,532	42,148
1862	31,443	15,182	1874	41,342	31,587

The average price of the ore in the year 1874, taken all round, gives 15s. per ton.

ANALYSES OF THE FOREST OF DEAN HEMATITE.—The hematite of this district, as far as it has been worked, has been thoroughly examined, and numerous analyses are at hand to show the composition of the several varieties. The varieties may be classified as follows:—First, a very compact, close-grained, black ore, of high percentage, locally termed "brush," sometimes met in large lumps, weighing from 2 to 3 tons, but more generally in small lumps mixed with the other ores; secondly, a cellular or spongy variety, often tough, also black and very rich, and occasionally occurring in large quantities; and, thirdly, a broken earthy-looking ore, assuming on exposure in heaps to the air a deep red colour, not very rich in itself, but largely used in admixture with the two previous varieties, and it appears to form nearly two-thirds of the bulk of the ore raised in the district. In the smelting of these ores considerable facilities are afforded by the abundance of good and cheap fuel from the Forest collieries, and when fluxing material is required from the limestone of the neighbouring hills. On the principal floor of the Museum of Practical Geology, in Jermyn-street, will be found in wall cases Nos. 48 and 49 a large collection of the ores of iron, the subject of this notice, occurring in the Forest of Dean and other districts of Gloucester and Somerset.

An examination of two varieties of ore, by Mr. Charles Greenham, of the Park End Ironworks, was made some years since, the samples submitted to analyses being described as follows:—First, the "brush" ore. The sample was composed mainly of fragments of the purple brown hydrated peroxide of iron, having the peculiar stalactitic structure which characterises this ore. A smaller quantity of the ochrey brown pulverulent variety was intermixed with the former, and, therefore, included in the "sample analyses." Another variety, the "grey vein," is thus referred to—"This ore appears to have been derived from the brush ore by the partial filling up of the cavities, with a crystallised double carbonate of lime and magnesia." The following shows the constituents of each variety:—

	Brush ore.	Grey vein.
Peroxide of iron	90·70	41·86
Protoxide of iron	} traces	} traces
Oxide of manganese		
Carbonate of lime		30·40
Phosphoric acid	0·07	0·13
Water	8·87	4·65
Sand and clay	0·60	1·32
Carbonate of magnesia	—	21·50
Total	100·24	99·86

Of these ores the brush ore yielded of metallic iron 63·50 per cent., and the ore of the grey vein 29·30 per cent.; it is further observable that neither of the above samples contain any appreciable amount of sulphur. The Forest of Dean ores have also been examined by Mr. A. Dick, whose determination is shown in the following statement, those examined being the "brush ore" and the more earthy variety known as "smith ore," derived from the carboniferous rocks:

	Brush ore.	Smith ore.
Peroxide of iron	90·05	89·76
Protoxide of manganese	0·08	0·04
Lime	0·06	0·49
Alumina	—	0·63
Magnesia	0·20	0·40
Phosphoric acid	0·09	0·13
Water	9·22	7·05
Insoluble residue	1·07	2·57
Total	100·77	101·07

The brush ore in the foregoing analysis was found to contain 63·04 per cent. of metallic iron, while that of the smith ore was equivalent to 62·86 per cent. These hematites compare favourably with those of Llantrissant, siliceous in character, and yielding but an average of 41·34 per cent. of metallic iron; those of Froghall, in North Staffordshire, calcareous in character, yielding an average of 36·98 per cent. of metallic iron.

In the north-western district of the Forest there are two descriptions of ore worked, known locally as "brandy brush" and "grey ore," the former distinguished for containing a high percentage of silica, and the latter of carbonate of lime and silica. The "brandy brush" ore also appears in a few other localities, while the "grey ore" chiefly appears on the western side of the mineral basin, near Coleford. The following gives the composition of each variety of these ores made in the laboratory of the Royal School of Mines:—

	Brandy brush.	Grey ore.
Sesquioxide of iron	32·76	48·98
Protoxide of iron	—	0·24
Protoxide of manganese	traces	0·16
Alumina	0·05	0·12
Lime	0·25	14·07
Magnesia	0·25	10·21
Potash	—	—
Silica	0·07	—
Carbonic acid	—	20·75
Phosphoric acid	0·09	0·06
Sulphuric acid	traces	traces
Bisulphide of iron	—	—
Water hygroscopic combined	3·55	5·18
Organic matter	—	—
Ignited insoluble residue	63·38	0·86
Total	100·40	100·63
Ignited insoluble residue.		
Silica	63·45	0·79
Alumina	traces	0·05
Sesquioxide of iron	traces	0·01
Total	63·45	0·85
Metallic iron per cent.	22·93	34·46

The ores raised on the eastern side of the Forest, at the well-known mines of Buchshraft, Findall, and Westbury Brook, appear to be more easily dealt with in the blast-furnace than the foregoing ores obtained on the north-western side; this is due to the fact that the great bulk of the ore is found in a pulverised condition, and freed from the presence of silica and other injurious elements, while the deposits referred to on the western side occur in a hard compact condition, requiring much blasting to effect its removal, and containing a high percentage of silica and carbonate of lime.

Of the mines on the eastern side, adjoining the properties of Messrs. Crawshay at Cinderford, to which some attention has recently been directed, and where extensive operations are contemplated at no distant period—the royalties of the five gales or tracts, known as the Polar Star, Duke of Gloucester, Emperor Napoleon, Berkeley Castle, and Elephant Iron Mines—the annexed analysis of the hematite iron ore there raised shows the following constituents, and compares favourably with the best quality of similar ores raised in the Forest and other districts in the kingdom:—

Peroxide of iron	82·64
Silica and lime	5·07
Alumina	1·09
Phosphoric acid	0·05
Sulphur	0·06
Loss in calcination	10·68=99·59

The amount of metallic iron in the raw ore is equal to 57·85 per cent., while in the calcined ore it is concentrated to the extent of 64·77 per cent. The analysis above noted was made in the metallurgical laboratory of the School of Mines.

ANALYSES OF SPATHOSE IRON ORE OF THE BRENDON HILLS.—This ore, especially rich in manganese, has attracted considerable attention of late years, the pig-iron made therefrom being of good quality and suitable for conversion by the Bessemer process. The ore has been examined by Mr. John Spiller, and is occasionally streaked with red hematite. At the outcrop of the veins the ore is invariably found to be converted to a considerable depth into brown hematite by the influence of air and water. The following shows its composition, and for comparison also is given analyses of the ore of Weardale, in Durham, which latter is found to contain traces of lead and copper:—

	Brendon Hills.	Weardale.
Protoxide of iron	43·84	49·47
Protoxide of manganese	12·64	2·42
Peroxide of iron	0·81	—
Lime	0·28	3·47
Magnesia	3·63	3·15
Carbonic acid	38·86	37·71
Phosphoric acid	—	trace
Silica	—	4·93
Bisulphide of iron	—	0·08
Total	100·06	101·23

The equivalent of metallic iron in the ore of the Brendon Hills amounts to 34·65 per cent., and of manganese 9·73 per cent.; the ore of Weardale giving 38·56 per cent. of metallic iron and 1·86 per cent. of manganese. The continental spathose ores yield from 37·41 per cent. to 52·55 per cent. of metallic iron, and from 2·37 per cent. to 7·31 per cent. of manganese. Of the spathic carbonates of iron raised in Styria, the following analyses, by M. A. Patera, show the chemical composition of both varieties—the spathic carbonates and the hydrated peroxides of iron, the latter being, as already stated, a production of the oxidation and weathering of the former. The samples examined being the produce of the mines of Eisenerz, in Styria:—

	Spathic carbonate.		Hydrated peroxide.	
Mines—	Embla.	Barri.	Soga.	Donnesalpe.
Silica	2·80	12·48	17·04	11·60
Sesquioxide of iron	—	—	66·10	75·08
Protoxide of iron	54·91	47·75	—	—
Oxide of manganese	—	—	0·40	0·80
Carbonate of manganese	1·30	0·99	—	—
Carbonate of lime	2·50	1·80	trace	1·00
Carbonate of magnesia	3·90	5·15	0·42	1·51
Carbonic acid	34·51	30·01	—	—
Water	—	—	14·90	10·25
Total	101·27	98·18	98·86	100·24
Metallic iron in raw ore.	42·40	36·87	45·83	52·55
Ditto, in calcined ore.	58·60	50·68	53·40	58·00

While considering the composition of the spathic ore of the Brendon Hills, it may be useful to have at hand for reference the following analysis of the same ore after calcination, the loss by such operation being equivalent to 34·29 per cent.:—

Magnetic oxide of iron	47·87
Sesquioxide of manganese	14·06
Lime	0·28
Magnesia	3·63
Insoluble residue	0·08
Loss by calcination	34·40=100·32

The amount of metallic iron in the foregoing is represented by 34·16 per cent. The following analysis, composed of a burthen of Brendon Hills ore and Welsh mines, is given by Dr. Percy in his Metallurgy, yield of metallic iron being 32·18 per cent. The details of analysis are given for comparison:—

Protoxide of iron	41·03
Peroxide of iron	0·41
Protoxide of manganese	0·55
Alumina	5·79
Lime	3·00
Manganese	3·36
Potash	0·86
Silica	13·35
Carbonic acid	28·49
Phosphoric acid	0·70
Water	1·93
Organic matter	0·07=99·54

The iron ore industries of Gloucestershire and Somersetshire, like

those of other districts during the past year, have been subject to periods of considerable depression, and so far as careful observation of commercial reports can be regarded as an index to prosperity or otherwise, it is observable that a large falling off in the yield of the iron mines for the year 1875 will be shown by the returns when completed for that year.

In a future notice the early history of the Forest of Dean iron industries will be considered, with an account of their rise and progress, the manufacture of pig-iron, tin-plates, including also returns of production from the earliest period, and the quantities of ore, coal, &c., used in manufacture in the counties of Gloucester and Somerset.

Original Correspondence.

MINING IN QUEENSLAND.

SIR,—The total production of tin during the past half-year was as follows:—

FOR THIRD QUARTER.

	Stream tin. Tons	cwt.	qr.	lb.	Ingot tin. Tons	cwt.	qr.	lb.	Total. Tons	cwt.	qr.	lb.
Warwick	1050	15	2	3	41	16	2	24	1092	12	0	27
Murrurundi	375	2	0	15	—				375	2	0	15
Grafton	428	15	0	27	—				428	15	0	27
Quarter's total.	1854	12	3	17	41	16	2	24	1896	9	2	13

FOR FOURTH QUARTER.

Warwick	1428	11	2	5	44	0	2	0	1472	12	0	5
Murrurundi	752	12	0	0	—				752	12	0	0
Grafton	625	16	2	8	22	11	2	0	648	8	0	8
Quarter's total.	2807	0	0	13	66	12	0	0	2873	12	0	13

Total for the half-year, 4770 tons 1 cwt. 2 qrs. 26 lbs.—decrease 600 tons.

Total for the year, 8881 tons 4 cwts. 2 qrs. 21 lbs.—decrease 2277 tons of stream tin.

These figures show that much of the tin raised during the first half of the year was forwarded to port during the second half of the year, and I am advised that the stock of tin in hand at the mines on Jan. 1 last was very light, the whole of the held stock having been forwarded to port.—*Brisbane, Feb.* 15. RESIDENT.

SOUTH AUSTRALIA.

SIR,—Since my last communication nothing of any special importance has transpired here in reference to mining affairs. Our great mines—the Moonta and Wallaroo—not only continue as productive as ever, but new lodes have been discovered, promising still further returns of ore. Taylor's shaft, on the Moonta, is now down 143 fms., and the lode is yielding 7 tons of 20 per cent. ore to the fathom at the level above. Some of the neighbouring mines have also made considerable improvement, as the Hamley, the Paramatta, the Yelta, &c. There appears some probability of the old Burra again becoming productive. Capt. Sanders has shown a great deal of energy and perseverance in carrying on the work of clearing away many thousands of tons of rubbish which impeded his plan of operations, and the sinking of the main shaft is now being proceeded with. They are working through purple sulphuret ore, almost granular in its appearance, and disseminated through the stone. Although not at present very rich, it can be easily dressed up to 30 per cent. or more, and is very likely to improve as a greater depth is reached. The old workings had stopped at 70 fathoms. I believe it is intended to sink down to 100 fathoms to test the mine to that depth.

The grand railway scheme of the present Government, and to which I alluded in my last, has not yet been commenced, owing to the opposition of the Legislative Council to the Stamps Bill, a pet measure of the Premier's, and on the passing of which he made his railway scheme contingent. I am not writing a political article, and shall not discuss this question further. I mention it by the way as being intimately connected with the development of the vast extent of mineral country lying to the north and north-east of Port Augusta. When our Parliament meets in April it is to be hoped that at any rate the Railway Bill will pass. I sent you by post a little pamphlet, containing three speeches of the Hon. J. P. Boucant, setting forth the Government policy; there was also a rough map showing the proposed lines of railway.

A new discovery of copper in the North has recently been announced. It is said to show rich green carbonates in quantity on the surface; the distance from Port Augusta is about 130 miles, and it is a little to the south-west of Blinman. But when once we see the commencement of the railway in that direction mines will be opened, not singly, but by the dozen. The deposit of carbonates of over 30 per cent. is said to be very extensive, and to resemble that which was found at the Burra, both in the quality and quantity of the ore.

There are many good mines in the North only waiting for the extension of railways to be actively worked. Under our present land system the farmers are pushing far into the interior, and our Government generally seeming more inclined to foster the interests of the farmer than of the miner, it is probable that this fact will help the extension of our railway system more, even, than the discovery of two or three new Burras would do. There is plenty of room for the profitable employment of British capital in working mines and constructing railways in the northern portion of South Australia, and when that immense mineral country is fairly opened up the results will be very great, and will introduce a new era in the history of the colony. It is not to be expected that in a population of 210,000 we should be able to find sufficient capital to develope a very large portion of our mineral wealth. I am free to admit that English capitalists have occasionally met with disappointment in their mining investments, but not more so, perhaps, than persons on the spot, and if due care be exercised in the appointment of their agents and managers I believe the risk of failure will be found much less than it was 10 or 15 years since.

Mr. Ralph Tate, F.G.S., having been appointed Professor of Natural Science to the University of Adelaide, arrived here last month. He is, I believe, a thorough geologist, and has had considerable practical experience, especially in connection with gold mining in South America. He can hardly fail to be a most useful man to the colony, and if he is able to devote a portion of his time to inspecting some of our less-known mineral districts, it is highly probable that new and important discoveries may be made. At least, his experience should enable him to give such advice as may lead to these results, or, on the other hand, as may prevent useless expenditure. One cannot be in Mr. Tate's company for an hour without seeing that he is no mere drawing room geologist, depending only on books and specimens for his knowledge.

Samples of the "mineral caoutchouc," "coorongite," or "elaterite," which I mentioned in my last, have been taken to London by Mr. G. W. Hawkes, S.M., who will be glad to show them to any person desirous of seeing them. Mr. Hawkes may be heard of at the office of the Agent-General for South Australia—Mr. F. S. Dutton, C.M.G.

Nothing further has been done to develope the deposit of petroleum supposed to exist below where the coorongite is found. The proprietors of the lease are waiting the result of arrangements now pending to increase their capital and procure more powerful boring apparatus.

Our gold mines are steadily progressing, and I am convinced that before very long it will be proved that we have a large extent of very payable reefs. The Lady Alice Mine, near Gawler, has not been doing quite so well lately, but the Waukaringa reef, north of the Burra, has greatly improved, and is turning out quantities of very rich stone. The reef has been cut lately on the Balaklava claims (adjoining the mine) at the 130 ft. level, and is very rich. About a couple of bushels of stone from the Alma were roughly crushed and washed, and yielded 4 ozs. of gold. Plenty of the stone now being raised would yield 4 or 5 ozs. to the ton, but the fair way to estimate it, of course, is the average of several hundreds of tons, and that will give all through about 1½ oz. gold per ton of stone, two-thirds of which will be profit. I feel sure that in two or three years' time South Australia will be a great gold-producing country.

Adelaide, Feb. 26. J. B. AUSTIN.

EMMA MINE.

SIR,—The late proceedings before the Congressional Investigating Committee in this country in regard to the Emma Mine will, no doubt, be perused with a great deal of interest in England, especially by the shareholders in that unfortunate mining company, although it has not transpired that any new facts of importance have been elicited. The same old stories that have been current in both England and America for three or four years past of complicity of fraud in first disposing of the mine, and subsequent unfair dealing in stock, were repeated and elaborated by Mr. Lyon, who certainly has been very strenuous and persistent in his efforts to make the *expose* as disgraceful as possible to all parties concerned in that transaction. But as to the reliability of this witness, that is an entirely different question, and there appears to be pretty conclusive testimony that his pertinacity does not spring from any desire to expose the wrong done to Emma shareholders, but is simply the pursuance of a plan of personal revenge, because he did not receive a large enough share of the spoils. He has been controverted on several important points, and there are numbers of substantial reliable men on this coast who say plainly that all Lyon's evidence is to be taken with considerable allowance, judging from the well-known character of the man. Be this as it may, the English shareholders in the Emma Mine must judge for themselves, but even were his assertions true in regard to the original sale of the mine, I still maintain the opinions I have before expressed in this Journal, that the failure to secure returns on the stock has not been owing to the worthless character of the property. And I may here reiterate what I have also before stated in print, that the mine was stocked altogether too high, and an almost unparalleled extravagance and imprudence have marked all its management. Scarcely any known mine in existence could stand the amount of pressure in this way that has been brought to bear upon the Emma, and I presume that the great majority of the shareholders entertain the belief that they are the innocent victims of American rascality and swindling, and to this they attribute the loss of their investment. It seems that this delusion is not confined alone to the Emma Company, but has also infected certain members of the British Government to such an extent that it is proposed to ask indemnity from the United States for the losses of these shareholders. Now, this is a delicate piece of satire which is not appreciated by our Western mining men, no matter how the United States Government may view it, especially as it is so well understood in this section of country what is really the value of the Emma Mine, and how grossly its management has blundered in almost every particular, from the very outset up to the present time.

Naturally they have felt very indignant at the results of this mismanagement in the wholesale condemnation of American enterprises, and mining in Utah in particular. Notwithstanding the opinion of some of our British cousins to the contrary, there are honourable and upright men here, who follow mining as a profession, who have always deprecated any and all efforts at misrepresentation in order to dispose of property from principle as well as policy, believing it to be entirely unnecessary, having full confidence in the real value of Utah Mines, and the absolute certainty of them ultimately proving a lucrative investment. These men have always protested at every possible opportunity against the injustice which has been done us, both at home and abroad, for the past three years on account of the Emma failure, and for this reason they have studiously refrained from placing any Utah mining property on the foreign market, not caring to run the risk of bringing more discredit on the country with another Emma fiasco. Now that the matter has become the subject of official investigation, and these misrepresentations acquired an official tone, by being embodied in the published report of the Congressional Committee, the honest miners of Utah deem that the time has come to make a public protest, and consequently a memorial has been prepared for presentation to Congress, setting forth the great injustice done to the mining interests of Utah, and stating the real facts as they exist in regard to the value, workings, and management of the Emma Mine, as well as the resources of Little Cottonwood district.

I append a copy of this memorial, which ought to be very interesting reading to the Emma shareholders, inasmuch as it may give them an idea what is the opinion of mining men upon this subject, men who are upon the spot, and whose experience qualify them to judge upon all such matters. Perhaps if the shareholders can once reconcile themselves to look the facts squarely in the face, and acknowledge their own mistakes, they will not be quite so severe upon American miners and mining enterprise. This memorial was prepared for signatures on the 14th inst., and will receive the name of every business and mining man who is at all acquainted with the value and history of the Emma Mine, and it will without doubt when presented to Congress place this *cause celebre* in a very different light in the public estimation than it has held for the past few years. The memorial reads as follows:—

TO THE HOUSE OF REPRESENTATIVES OF THE UNITED STATES.

Your memorialists respectfully represent that they have read the published report of the proceedings of an investigation in regard to the Emma Mine, and that such reports do great injustice to the mining interests of Utah; that the mines of Utah during the last year have produced $7,000,000 of bullion, that of this amount Little Cottonwood district has produced $3,500,000, and mostly from the vein in which the Emma Mine is situated, that these results have been obtained almost exclusively by the unaided efforts of the miners themselves, residents of Utah, while a large number of the most valuable mines held by foreign corporations have been allowed to remain unworked, or have been so badly managed as to produce comparatively nothing; that among these the Emma Mine is a conspicuous example of neglect and bad management; that while other mines upon the same vein—Flagstaff, Vallejo, South Star and Titus, North Star, Prince of Wales, Reed and Benson, Davenport, and many others far less promising in the beginning, have been worked from 800 to 1200 ft in depth with the most satisfactory results, nothing has been done on the Emma but the most wasteful extraction of the large body of ore found near the surface. The fact that a fault occurred in this mine was no reason for its abandonment, for the same thing has occurred in nearly every mine on the vein, and is usual in all silver mines. That the Emma is a deep seated fissure and an exceedingly valuable mine is not only evidenced by the vast body of rich ore already extracted, but by the great strength of the vein, and great depth to which adjoining mines are now worked, in which the bodies of ore have increased in quantity and value as depth has been obtained; that the evidence that the Emma is no exception to the other mines on the same vein, as regards continuance in depth, is daily accumulating by developments made by other parties in running deep tunnels under the Emma Mine; that the reputation of this mine during the years 1871 and 1872 was unsurpassed by anything known in the United States, except the great Comstock vein. And your memorialists further represent that it is the universal opinion of mining men that the Emma Mine, with ordinary good management, would have continued to pay dividends, and been satisfactory to its owners, and that the only cause of failure has been the very wasteful, neglicent, and unskillful management in the hands of a foreign corporation; that your memorialists do not desire to enter into any personal controversy in regard to the sale of the Emma Mine, but wish to make it known that at the time of the sale the mine was regarded in this community as worth many millions of dollars, and that the strongest faith still exists in its great value under proper management, and they protest against all efforts of interested parties to misrepresent or depreciate the merits of this and other great mines on the same vein, and to create an unfavourable public opinion in regard to the mining resources of Utah.

B. A. M. FROISETH, United States Surveys.

Salt Lake City, Utah, March 15.

RECENT DEVELOPMENTS IN EMMA HILL, UTAH.

The Special Correspondent of the *Engineering and Mining Journal* (New York) writes:—"I have it on reliable authority that ore has been struck in the Bay City tunnel. Accurate surveys have not yet been made of the position of this ore body, consequently it is not known definitely if the ore is in Emma or North Star ground. As these two mines are immediately adjoining it makes but little difference in which the ore is found, since, in any case, it proves that the mines are not merely superficial, but have a future. Probably this evidence of the inaccuracy of Mr. Atwood's report will stimulate the stockholders of the Emma Silver Mining Company to do something towards the intelligent development of their mine. Unless the majority of those familiar with the mines of Emma Hill are mistaken in their opinion of the veins there, the prosecution of a mining enterprise would prove much more remunerative than a suit for the recovery of money invested. It seems as it it would be better for the Emma stockholders to learn first if they had been swindled by their own officers before commencing action against the vendors.

About four years ago a company—known as the Howland Tunnel Company—commenced work in Little Cottonwood. They started a tunnel in the canyon, about three-fourths of a mile below Alta, with the object of cutting Emma Hill longitudinally on a course about north-east or south west, and thus intersect the veins of the hill at right angles, striking them at a depth of about 2000 ft. The total length of the tunnel will be 6000 ft. It the first 100 ft. a small vein was crossed. This has been but little developed, since the ores require concentrating before being marketable. About 570 ft. in the ground looked favourable for finding ore. A drift was started, which in a few feet ran into ore. The drift has now passed through 12 ft. of ore without finding the hanging wall. This ore will also require concentrating before being marketable.

The samples which I have seen show galena with a little pyrites in a quartz gangue. This strike has a general interest, in so far as it proves the presence of a second large vein of ore traversing the hill, running nearly parallel with the Emma-Flagstaff vein, and entirely independent of it. Physically it is entirely different, the ores resembling more those of Bingham. Samples of the ore as mined assayed from 13 to 22 per cent. lead, and from 25 to upward of 100 ozs. of silver.—S. C.: Salt Lake City, March 18."

THE EMMA MINE, AND THE ENGLISH PROMOTERS.

SIR,—I see by the London papers that writs have been served on General Schenck, the American Minister, as also the other English gentlemen (I mean gentlemen in the full sense of that word) original promoters of the Emma Mining Company in London. I imagine by this time I ought to know something of the Emma Mine, its antecedents, both technical and historical, and possibly a little more than some persons who are trying to figure in the matter, who were never even within 3000 miles distance of the mine. You are aware that my pamphlet did not allude to any one of the original promoters in their connection with the floating of the company in London. I purposely avoided any allusion to them, waiting for a better opportunity of coming forward in their defence. I reserved my humble opinion for a day when my evidence in Court might be required. I believe few persons are in the position I am to bring forward sound data in their defence. I have been acquainted with the Emma Mine long before there was any intention or idea of placing it on the English market, and am convinced from reasons and facts I am well versed in that the idea of fraud never entered the minds of those gentlemen. My pamphlet on the mine was written in Utah, and one year before arriving in London in 1874, and therefore one year before I became acquainted with Mr. A. W. Macdougall. This is sufficient evidence, I warrant, that the pamphlet was not written for any purpose, but merely as a professional *tour de force*.

In referring to the promoters in England, I have the conviction, and a most intimate one, that no fraud ever existed or ever was intended on their part. In fact, the accusation reminds me of Don Quixote and the windmills; he imagined things, and his imagination worked wonderfully on him. The facts, data, and proofs of this assertion will some day be given out to the British public (who know what fair play is) just in the same manner as the pamphlet on the mine, which carried sound conviction to the minds of the shareholders, in consequence of which the votes (for not winding up) rose from 16,000 to 27,750. This was stated in Court before Vice-Chancellor Sir R. Malins, and by the opposing counsel—"That Mr. Henry Sewell's pamphlet had influenced the majority of the shareholders, and carried the day." I may soon be in London, when I shall be able to bring forward all these facts, and trust to be able to carry conviction to the majority of the British public that no fraud existed or ever was intended. In saying this I repeat I have no persons or purposes to serve but the truth, for I am not acquainted with any of the promoters except Mr. Anderson, M.P., whom I once met accidentally in Salt Lake City. HENRY SEWELL, M.E., F.R.G.S.

Lima, Peru, March 12.

P.S.—In my next I will describe a trip I made across the Andes to the River Maranon.

THE EMMA MINE.

SIR,—I am directed by the board to forward you copies of two letters from James Scrimgeour, the person left in charge at the Emma Mine, both of which were received yesterday at the office of the company from Mr. Attwood, the late manager. The board feel that the information contained in Mr. Scrimgeour's letter of March 14 that "there is no water at all in the Attwood winze" is a matter of great importance to the shareholders, who will remember that the contention of the present board has always been that until the Attwood winze, which has been full of water could be examined, no opinion could be arrived at which would justify the shareholders in coming to the determination that the mine was exhausted. The board will at once take steps to have the Attwood winze examined.

CHAS. E. ALLEN, Secretary.

Queen Victoria-street, London, April 12.

The Emma Silver Mining Company (Limited), Alta City, U.T., March 7.

DEAR SIR,—My last letter to you was under date 29th ult., in which I mentioned the Bay City Tunnel had been run through another lead at 1,160 ft. from its mouth. Am now inclined to think they have found some good ore there. I saw a sample in the hands of an outside party yesterday that was said to come from that lode, and it resembles very much that which I assayed for Mr. Fink, and which gave 130 ozs. silver. I am also told by one of the merchants in town that Mr. Fink has been negotiating for ore-sacks, stating that he would need a good many. This looks a little more like business than anything heretofore. Of course, I cannot vouch for the accuracy of any report I hear. Mr. Fink still remains strictly reticent. He leaves for St. Louis to-morrow. Fleming has not yet shipped any ore, nor have I learned anything more of his whereabouts in the tunnel. Water in Emma Mine shaft yesterday was down to 91 min. 6 sec. below No. 4.

Mr. G. Attwood, Resident General Manager, London. JAS. SCRIMGEOUR.

The Emma Silver Mining Company (Limited), Alta City, U.T., March 14.

DEAR SIR,—I wrote you last on 7th instant. At present writing there is absolutely nothing new to communicate. I am told Fleming is still coming from Equitable Tunnel, with the view of getting down to Bay City. He had not yet attempted to ship any ore. Bay City is working only half-time, on account of scarcity of spring water to feed the boiler; they dare not use the tunnel water on account of its corrosive qualities. Water in Emma shaft has gone down 14 in. in seven days, showing a decrease in the drainage of about 1 in. per day. The steam drill is, judging from the sound, approaching the shaft. I can hear it distinctly now in No. 3 as I could in No. 4 two weeks ago, and more distinctly in the shaft. There is no water at all in Attwood winze. Weather very bad for past week.

Mr. G. Attwood, Resident General Manager, London. JAS. SCRIMGEOUR.

SOUTH AURORA MINING COMPANY—THE PROJECTED TUNNEL THROUGH TREASURE HILL.

SIR.—Your correspondent "An Old Shareholder," in last week's Journal, says:—"I have just seen a gentleman who visited White Pine last year, and he assures me that it (the projected tunnel) is the most practical, and should be the cheapest, way of exploring this (South Aurora) mine. He also assures me that mining authorities out there laugh at the ruinous policy pursued by our board of directors in allowing such a property to lie idle, having only explored it to a depth of a few fathoms." South Aurora shareholders do not require the opinion of "mining authorities out there" to apprise them of this, as the developments at North Aurora and Ward Beecher sufficiently attest the fact that the Treasure Hill ore deposits improve in depth. Only a fortnight since this was pointed out by Messrs. F. W. Mansell and Co. In their "Mining News of the Week" they wrote thus:—"Favourable is the feature, especially in this formation, that in depth the character and value of the veins improve; for this reason the proposal Capt. Drake is about to submit to drive a tunnel through Treasure Hill is of incalculable importance, beyond the significant fact that this deep tunnel will be a cross-cut (so to speak) intersecting the vein at a greatly increased depth. The general depelopment of the mine will be thereby carried on at a considerably reduced expenditure."

Experience, therefore, shows that the ore deposits in this district are not merely superficial but continuous in depth. This ought to be an incentive to the South Aurora board to lose no time in arranging preliminaries with the Eberhardt board to commence the tunnel without one moment's unnecessary delay.

The "ruinous policy" of the South Aurora board is not, I am sorry to say, so "ruinous" in its inaction at South Aurora proper as in its costly activity in the heterogeneous ventures in which its capital is so rapidly "passing into thin air." Poor copper, poorer gold and phosphate, seem an inconsistent application of capital restored by the original venders for the accepted, if not the avowed, object of developing South Aurora proper. I may be told that the "policy of the board has been approved by the shareholders," as, indeed, I have been already told, but that does not improve the policy itself, which I once more contend is as bad and unsound as it can possibly be, even admitting (which I most certainly do not) that the mines towards the development of which we have advanced our capital are of an ordinarily favourable character, with mediocre prospects of success—for instance, our advance to the Mammoth Copperopolis Company may turn out all right, but will it?

Let shareholders band together and insist that the unexpended capital shall be set aside towards the completion of a tunnel through Treasure Hill. Thus may South Aurora be proved that valuable

mine predicted of it when the well-known American bankers first introduced it to the English public.

April 11. ANOTHER OLD SHAREHOLDER.

BOILER AND CYLINDER CASING.

SIR,—The quantity of fuel absolutely lost and wasted in raising steam is so immense that, even if coal were a drug in the world and positively inexhaustible, it would be a pity to think that so large a quantity had been uselessly squandered; knowing, however, as we do, that the consumption is so great, and that the supplies must come to an end in all the presently worked collieries at no distant date, it necessarily behoves us to see that no wanton lavishness on our part should be recklessly indulged in.

All uncoated boilers, cylinders, steam-pipes, &c., which are so intensely heated inside, and have their external surfaces exposed to such a variety of temperatures, radiate a deal of their heat to no purpose, and condense on the insides of their steam spaces much of the water which had already been converted into steam at a great cost of combustible materials. In order to prevent this as much as possible various kinds of "clothing" have been invented, with a view to prevent the steam generated from being reduced to water over and over again, thereby necessitating the expenditure of an extravagant amount of fuel to produce an entirely inadequate effect. In order, therefore, to ascertain which was the best of all kinds of patent boiler coating, I instituted scientific experiments and enquiries to test the non-radiating properties of the different compositions for which letters patent have been taken out with the above object, and send you herewith tabulated results obtained by an impartial expert. Mr. Furrell, in the presence of the able and highly experienced engineer, Mr. Tomlinson, who has the charge of the locomotive department of the Metropolitan Railway Company, near the Edgware-road, the results of which I enclose for your perusal and consideration, and which I should, indeed, feel pleased by your laying before your readers, as numbers of them who are steam users would, no doubt, wish to be informed as to the best means of economising fuel, and thereby considerably diminishing their expenditure, besides obtaining far better results in the working of their engines. Of course, it would be useless for me to detail here the poor results obtained from many patents taken out for the purpose, and I will content myself with giving the comparison between Stone's patent glass cement, which is the best invention patented for the purpose, and the principal coating hitherto generally used, which, though superior to many largely patronised by the public, is, nevertheless, considerably below Stone's in non-radiating and protecting properties.

The superiority of Stone's cement over the best ordinary covering, is not to be wondered at when your readers are made aware that it consists mainly of glass, which is one of the best non-radiators at all applicable to highly-heated surfaces, as well as silicates and chalks all of which are theoretically ascertained to be the best materials for the purpose.

From experiments made, on my suggestion, to determine the relative saving of fuel by different boiler coatings patented and in use, the results obtained were 5·17 lbs. of water actual, and corrected to the Government standard 5·47 lbs. of water per lb. of coal, with an uncoated boiler; 5·19 or 6·20 of water raised to steam per 1 lb. of coal with the best of coatings hitherto in general use; while in a boiler coated with Stone's glass cement 7·05 or 7·45 lbs. of water were converted into motive-power by each pound of coal, and when in addition to the coating Stone's patent air casing was used 7·73 or 8·17 lbs. of water were turned into motive-power by each pound of fuel. I suggested that increased advantages could be obtained by turning the steam jet into the chimney, and then 8·02 lbs. of water actually, and 8·50 lbs. corrected to Government standard, was raised by each pound of coal used.

Stone's patent is so great an economiser of combustible that in a boiler lately covered for Messrs. Yates and Alexander, of Chancery-lane, with Stone's glass cement and his iron casing, by which a cushion of air is kept constantly circulating round the boiler, and the extra heat which escapes through the coating is picked up and conveyed again into the ash pit, the saving of fuel is about one-sixth, when the boiler was uncoated; 3 tons of coal, I hear, were used in 72 hours; now, with coating and casing the 3 tons last 113 hours. An economy of fuel is attained never yet effected by any other patent, and I would strongly urge steam users to pay a visit to Messrs. Yates and Alexander's printing premises in Chancery-lane, and to Messrs. Wailes and Robinson's engineering works in the Euston-road, where Stone's patents are in use. They will then satisfy themselves of the value of Stone's invention, both in securing economy of fuel and efficiency in work, which, as an impartial practical engineer, I maintain to be a great success. WM. H. VILLIERS SANKEY.

London, April 11. Cor. Mem. of the Royal Dublin Society.

SEPARATION OF MINERALS.

SIR,—I see in the Supplement to the Journal of March 18 a letter signed an "Independent Shareholder," wherein he said "I will give your readers a fact that came under my own notice in a certain mine. Their dresser was giving every satisfaction, when for some reason he left the mine. Another took his place, and to the great surprise of all concerned the first parcel he dressed realised over 4*l.* per ton above any they had previously sold." I would here remark, was it by the lead, or was it not owing to the unusual richness of the ore for silver? If so, no practical merit is due to the dresser, as the ore dressed was by the same people, same machines, and on the same dressing-floors laid out by the former dressers. But there is something strange, Sir, about the former dresser giving every satisfaction, and yet he had to leave the mine. A MINER.

Tavistock, April 5.

THE LEAD MINES OF DERBYSHIRE—No. III.

SIR,—The carboniferous limestone of Derbyshire is usually spoken of, in a mining point of view, under four divisions—1. Limestone being the uppermost, these limestones are separated by narrow bands of clay, which occur regularly and are well known to the miners. The first limestone is the most productive in lead ore, and the fourth the best. The layers of toadstone (a kind of basalt) are very irregular, and a source of much trouble to the miner. In some parts of the mineral field they do not occur at all, especially in the North, but in the neighbourhood of Matlock, Bonsall, Wirksworth, and Bakewell, they are developed on a large scale. The clays and toadstones appear to be intimately connected with the productiveness of the mineral veins. The whole district abounds more or less with underground fissures and caves, especially near Matlock and Castleton, where they are shown to visitors under the name of caverns. These caverns are of great length and immense size, and rarely disappoint those who visit them. Water flows through most of them to great distances, as it does also through the limestone of Flintshire, near Holywell. As might be expected, the mining districts of Flintshire and Derbyshire bear a very strong resemblance; we are not, however, aware that toadstone, or any intrusive rock of that nature, is found in Flintshire. It would be superfluous here to describe any of the caverns mentioned above, so minutely are they delineated in the various guide-books. These fissures are of great use in draining the veins to a considerable depth. No one can traverse the mineral district of Derbyshire without noticing how much more productive the eastern side has been than the western: commencing near Wirksworth, and traversing the western side in a northerly direction, passing by the villages of Hopton, Tissington, and Thorpe, then skirting the lovely valley of romantic Dovedale as far north as Hartington, we see comparatively few mounds of rubbish, horse-whims, miners' huts, and all those indications of mining activity which are so frequent in the central and eastern districts. Either this proceeds from the greater prevalence of the lower measures of limestone on the western side, or else from the greater difficulty of obtaining licences to work—we cannot say which. When, however, a few years ago the Success and Rushy Cliff Mines were worked near Ashbourne, the miners in the eastern districts prophecied failure, and declared the mine a bad one, so it turned out. We have visited almost every mining district in Great Britain, but never have we seen land so scared and seamed with mining works as the eastern side of the Derbyshire limestone. In the neighbourhood of Wirksworth, Matlock, Middleton, Winster, Bakewell, and many places further north, almost every field is dotted over with mine hillocks, some fresh, and glistening with spar, or yellow with barytes (the common vein stuffs); others of soft green turf, blue and yellow in summer time, with the wild pansy, and most of them crowned with old windlasses, and here and there a dilapidated horse-whim. Not one in twenty of these mines are worked regularly, though small parties of men work many of them at intervals. The shafts are generally shallow, from 20 to 30 fms. deep, and often placed very near each other; by noticing the direction of the lines of hillocks, with others crossing them, the run and extent of the veins and cross-veins can easily be made out. In our next we will treat of the nature and contents of the mineral veins. J. B.

SAINT PATRICK MINE.

SIR,—In reference to this property, it may be remarked that "Coming events cast their shadows before them." At the meeting held at the London Tavern, on March 23, the utmost confidence was universally expressed that lead would be almost immediately discovered in one or other of the three cross-cuts now being driven at the respective depths of 60, 90, and 120 yards to intersect five rich well-known lodes, which run through Prince Patrick and South Prince Patrick adjoining, and to the west. These sanguine predictions are about to be verified, for by the latest reports from Capt. W. Francis we find that nice facings of lead ore have began to show in the 120 yard cross-cut; these facings are in the rock in east and west partings, denoting that the lode is close at hand, and may any hour give tidings of a rich lode. The first of those so well known, and a lucky stroke of the pick may now show the treasures known to be hidden there, such riches as seldom are equalled except in the wealthy district of Holywell, in Flintshire. Enormous and immediate profits may be forthwith made, as in the case of South Prince Patrick. But this latter property embraces only a portion of St. Patrick sett, which is very large. Large flats of lead and pipes of ore will add vastly to its lasting prosperity, with oblique veins to be found. Indications of lead are magnificent. But 6500 shares of 1*l.* each are issued, held in great part by a very small proprietary. St. Patrick Mine offers every satisfactory feature to become a very great success. Ample cash in hand remains. Working expenses are small indeed, and the prospects will, it is expected, shortly exceed all the most sanguine expectations. The lease is held from the Duke of Westminster direct, at a reasonable royalty. That St. Patrick Mine may shortly make itself a name second to none on the mining Share List is the opinion of all interested in it. LARGE SHAREHOLDER.

BURROW AND BUTSON MINE.

SIR,—As an unfortunate holder of 100 original shares in the Burrow and Butson Mine, I crave the use of your columns for the purpose of impressing upon my fellow-victims the importance of responding promptly and liberally to the appeal made by the directors for the funds necessary to the prosecution of the suit instituted with a view to the rescue of, at least, a part of the subscribed capital. I entertain grave suspicions of foul play, good hope of a successful issue to the suit, and a strong desire for a searching enquiry into the circumstances which have led to a disaster which may be serious to many. Surely the modest demand of 1s. per share will not be refused, in view of the possible advantage to be gained.

April 6. SHAREHOLDER.

[For remainder of Original Correspondence, see to-day's Journal.]

Meetings of Public Companies.

EXCHEQUER GOLD AND SILVER MINING COMPANY.

A general meeting of shareholders was held at the offices, Palmerston Buildings, on Tuesday,—The Right Hon. the Earl POULETT (the chairman of the company) presided.

The notice convening the meeting was read, and the report of the directors and balance-sheet (which appeared in last week's Journal) were taken as read.

The CHAIRMAN said the prospects were that the Exchequer Company had now commencyd a new era, and that its success was assured. Since last he had the pleasure of addressing the shareholders Mr. Romaine, C.B., had been elected to a seat at the board. To that gentleman they were very much indebted; in fact, he (Earl Poulett) might say the success of the company during the last six months had been really attributable to Mr. Romaine, who went out to see the mine to satisfy himself as to the correctness of the reports received during the last six years. Mr. Romain found everything as stated. So satisfied was he that he not only had no hesitation in investing a certain sum of money in the mine, but many of his friends had also come forward. Mr. Romaine had made a minute examination of everything, and found every detail as the manager had always stated. Mr. Romaine stayed at the mine for three weeks, and upon his return to New York telegraphed that a certain sum of money should be placed to the credit of the company. From that time they had never looked behind, but had gone prosperously forward; and, judging by the way things were going on, and the latest reports from Mr. Chalmers, he (Earl Poulett) thought that in the course of a fortnight or three weeks very important information would be received. A telegram had been expected from Mr. Chalmers announcing the first monthly clean-up. Everything was ready to run—indeed, the millmen were, at the date of the last advices, half-way on the road between the Carson river and the mine; but since then snow had fallen, delaying for some days the progress of the men. As soon, however, as they arrived there the running of the mill would be commenced, as the entire machinery for working eight stamps was completely ready. The directors had written to Mr. Chalmers not to send home any telegram to say that all was going on satisfactorily, because all were aware that new machinery, after running a few hours, requires adjustment and regulation. That false hopes might not be raised Mr. Chalmers had been communicated with not to send a telegram until he knew absolutely the actual result of the clean-up of an ordinary average run. Everything was as satisfactory as any mine in the world could be; he (Earl Poulett) was a large shareholder, and all he could say was, as the result of his opinion, he would not take for his stock four times the amount that could be had in the market to-day. (Hear, hear.) Before concluding, he might mention that some 5000 shares had been held in reserve, which, if necessary, would at some future time provide capital for additional stamping-power, without interfering with or reducing the dividends paid to shareholders. (Hear, hear.) If those 5000 shares were sold at 6 or 7 prem.—which he fully expected to see the price before Christmas—ample capital would be provided for all eventual purposes. Having congratulated the shareholders upon the satisfactory position of the mine, but more especially upon its encouraging prospects, he moved that the report and accounts be received and adopted.

General RIGHY seconded the proposition.

The CHAIRMAN said he had received a letter from their friend, Mr. Syme, asking him (Earl Poulett) kindly to state to the shareholders his extreme regret that from indisposition he was unable to be present at the general meeting, hoping, as the prospects of the mine were now so satisfactory, they would not mind missing him for once.

In reply to questions from various shareholders, the CHAIRMAN said the expenses were very small, and if anything were wanted there were plenty of them quite ready to come forward and provide anything necessary to carry on the company. (Hear, hear.)

Mr. A. BURNETT said that, as the directors refused to accept any remuneration for their services, the item of 460*l.* appeared somewhat large.

The CHAIRMAN pointed out that in that item there were included the office rent, secretary's salary, printing, &c.

Mr. BROWN (auditor) said there was a small item due from the I.X.L. for one portion of the joint occupation of the offices.

Mr. BURNETT suggested that as the company had commenced a new era and its success was assured, the desirability of preparing subsequent balance-sheets somewhat more in detail.

The CHAIRMAN said the board would be only too happy to adopt any form shareholders would like.

The report and balance-sheet was received and adopted.

The CHAIRMAN had much pleasure in proposing the confirmation of the election of Mr. Romaine, C.B., as director. He had already referred to the obligations of the company to Mr. Romaine, and all he need now do was to thank him for the trouble he had taken as well as the substantial assistance afforded. (Hear, hear.)

The proposition was seconded and carried unanimously.

Mr. ROMAINE, C.B., thanked the shareholders for their confidence. When he went out to the mine he did not hold a single share, but had heard good accounts of it. To show how easily shareholders could investigate their property, he might mention he went out to the mine, was with Mr. Chalmers 10 days, and back in England in two months. Accompanied by one of Mr. Chalmers' workmen he went through every working in the mine, selecting his own samples, the result was that he was now, he believed, one of the largest shareholders in the company. He had never sold a share, nor did he intend to sell at anything like the present price. (Hear, hear.) Since he came back the price had advanced from 7s. 6d. to (he believed) 37s. 6d. His own impression was, that as soon as the mill had been got to work most satisfactory returns would be made, as there were something like 600 tons of ore ready at the mill, sufficient to last till the snow had gone. All that was wanted was to determine which description of furnace should be employed; the directors had telegraphed to Mr. Chalmers to erect which furnace his experience led him to conclude would be the most suitable. By the end of June he (Mr. Romaine) hoped the furnace would be at work, as well as 20 heads of stamps. It was hardly safe to reckon 300 working days in the year, much safer would it be to calculate 250 days. If only a fair quantity of ore were sent to the mill of (say) but $100 grade he was perfectly satisfied the result would be a net profit of 100 per cent. upon the entire capital of the company. He should not be content with that, as he had no doubt they would be able to do much better. He should not be at all satisfied till they had 50 stamps at work, and there was no reason why there should not be that number. He saw no reason why in a couple of years they should not be able to do that, as there was ample mineral available to keep 50 heads constantly employed. (Hear, hear.) Nothing could be more satisfactory than the scientific, masterly, and generally able manner in which Mr. Chalmers had conducted every detail, and he deservedly had the complete and entire confidence of the board. Mr. Chalmers had done more than any two ordinary men could have accomplished—he had been lawyer, surveyor, miner, engineer, and assayer. He (Mr. Romaine) hoped the time would come to in some way recompense Mr. Chalmers; no man would have lived there so long without the certainty of becoming rich. He believed Mr. Chalmers interest in the mine would make him a wealthy man, and that handsome profits would be realised by all who had associated themselves with him. (Hear, hear.)

The CHAIRMAN said the next business was the re-election of the retiring directors—Major-General Campbell and Mr. Samuel Smith. He (Earl Poulett) was sure the shareholders would be only too glad to re-elect those gentlemen as directors, as every member of the board had always done the utmost to promote the best interest of the company. He had much pleasure in proposing the re-election as directors of Major-General Campbell and Mr. Samuel Smith.

Mr. A. BURNETT seconded the proposition, which was carried unanimously.

A special meeting was then held for the purpose of discussing and passing a special resolution in the following form:—

That the directors may be and they are hereby authorised to issue debentures to the existing holders of debentures of the company for the amount of the interest due and to become due up to July 1, 1876, on all the debentures which have been issued by the company, and are still outstanding, and that the rate of interest to be secured by the debentures hereby authorised to be issued shall not exceed 12 per cent., and that such debentures shall be a first charge upon all profits made by the company and received by the directors or on their behalf in this country. A form of the debenture proposed to be issued can be seen at the offices of the company.

The CHAIRMAN said that notice had been given of an amendment "to insert after the words 'interest due,' on the third line, the following:—'With compound interest thereon, calculated at 10 per cent. per annum from the dates when the simple interest became due.'" He (the Chairman proposed the resolution set forth in the notice.——Lieut.-Gen. RIGHY seconded.

It was owing to the forbearance of the debenture-holders that the interest had not been claimed when due, and it was only fair they should be allowed interest on the amount outstanding.

Mr. S. SMITH (a director) said, as a large holder of debentures, he was perfectly satisfied with the arrangement made by the board.

Mr. ROMAINE, C.B. (a director) said that three-fourths of the debentures were held by the directors and their personal friends, and they were perfectly satisfied with the interest received.

The amendment, in the absence of a seconder, was not put to the meeting. The original resolution was carried unanimously.

The CHAIRMAN said that Mr. Joy had also visited the mine, and would, perhaps, kindly favour the meeting with his views thereon.

Mr. ALGERNON JOY said he was a month at the mine, and five weeks in San Francisco; at the latter place he saw a great many mining engineers and mining investors. There was very little doubt in his mind, when he visited the mine, that the chances were strongly in favour that the mine would turn out worth from five to fifty times the capital of the company. Some of the Comstock mines, in the same locality, had been sunk 1500 ft. before ore was met with. Others opened out richer from surface, returning in a few months from 10 to 100 times the capital expended upon them. At the Exchequer, as far as the workings had been opened up, there was good pay ore in every run, and there was very little doubt that good ore would continue to be opened out. The report stated—"These details, of course, will merit attention, but their practical interest has been eclipsed by the rich discoveries subsequently made in the 200 and 300 ft. levels, which have opened up large bodies of ruby silver ore, in value ranging from 24*l.* 11s. 7d. to 163*l.* 11s. 9d., showing an average, according to Messrs. Johnson and Matthey's assays, of 95*l.* per ton. If you allow 6*l.* per ton to cover all mining as well as milling expenses, with a fair amount of dead work to keep developments well in advance of the extraction of ore, and assume that after the new battery is erected, when the weather there moderates, we shall be able to manipulate 20 tons of ore daily for 300 working days per annum, you will arrive at an approximate estimate of what the future of this company bids fair to accomplish for us in respect of dividends." Assuming 20 tons per day for 300 working days per year, upon an ore of the average value of 95*l.* per ton, would give 450,000*l.* a year, or 450 per cent. on the capital of the company; at 10 per cent. that would make the shares worth 45*l.* each, and at 25 per cent. the shares would be worth 11*l.* 5s. He did not say it would not act even better than that, because great results were the peculiar character of silver mines in that formation. Making every possible deduction, the investment was, unquestionably, a very good one.

Mr. BURNETT mentioned that one of the Comstock Mines last year gave a net profit of 2,500,000*l.* upon a capital of 100,000*l.*

Mr. JOY said the Exchequer might do as well by-and-bye when more fully developed.

Mr. TAYLOR asked if Mr. Joy could give any information about the ruby silver?——Mr. JOY said that had been discovered since he was there.

The CHAIRMAN said some had been discovered known to miners as "bloody ore," showing splatches just like the smear of a finger with blood on it.

Mr. JOY, in reply to a question, said that he measured the ground and took samples; after making a considerable discount, there was no doubt that if they did not sink any more, nor made any further explorations, there was enough ore ready to be stoped away that would return at least double the capital of the company. (Hear.)

Mr. TAYLOR proposed a vote of thanks to the noble Chairman and his colleagues for their earnest and successful managment of the company's affairs. Words would hardly express how deeply indebted were the shareholders to the Chairman and his colleagues.

Mr. SURTEES seconded the proposition, which was carried unanimously.

A unanimous vote of thanks was passed to Mr. Lewis Chalmers for the careful and successful manner in which he had conducted the operations at the mine.

The CHAIRMAN, on behalf of his colleagues and himself, returned thanks to the shareholders for this renewed mark of their confidence. The board were extremely pleased they had been able to keep the ship from sinking, but they must express their thanks to the shareholders who had come forward in the hour of need. As he had already said, everything now was going on as well as it was possible, and he hoped that he might have the honour to meet the shareholders upon the next occasion to congratulate them upon the realisation of a splendid success. Since they had done him the honour to place him in the chair each meeting had been of the most harmonious character, contrasting strongly with the proceedings of other com-

panies which one reads in the public newspapers. Having accepted the post of Chairman, he deemed it incumbent on him to fulfil its duties, and do all in his power to promote the prosperity of the company. (Hear, hear.) The meeting then separated.

LINARES LEAD MINING COMPANY.

The half-yearly general meeting of shareholders was held at the company's offices, Queen-street-place, on Thursday,

Mr. W. Cox in the chair.

Mr. H. SWAFFIELD (the secretary) read the notice convening the meeting, and the Chairman having declared it duly constituted, the report and accounts were taken as read.

The CHAIRMAN, in moving the reception and adoption of the report and accounts, said that the few observations which he would have to make would be somewhat longer than usual. They had been enabled to declare what had been rightly described in the report as a handsome dividend, for a dividend of 10s. on a 3*l.* share for the half-year was a handsome one. The mine was undoubtedly in a highly prosperous condition, but he would not be satisfied to say it as it was seven or eight years ago when they were paying 15s. on the 3*l.* share every half-year. The report told the shareholders that they proposed resuming operations at the old mine of Pozo Ancho. He might remind them that their property really consisted of four mines; the original one was the old Pozo Ancho, but they had also as part of the original purchase Warne's and the San Francisco Mines. When they commenced operations they set to work on the Pozo Ancho, and obtained enormous quantities of ore and large profits, but they did not neglect Warne's and the San Francisco, so that they might have something to fall back upon in the possible event of the Pozo Ancho falling off. They then purchased the Quinientos, so that when the Pozo Ancho really did temporarily fail them, and that more suddenly than they had expected, they were soon enabled to return to the dividend-paying state. When the Pozo Ancho was suspended they had no reserve fund, the price of lead was about 18*l.* per ton, and the mine was looking poor. Working as they were for the shareholders, they thought it better to suspend the old Pozo Ancho and create a reserve fund, than to stop the dividends and go on with the development of the mine. The price of lead had now improved, and they had a reserve fund of nearly 4000*l.* They did not regret temporarily relinquishing Pozo Ancho, although in it they had had a mine which was one of the richest ever known, but what they now suggested was that they should apply a portion of the reserve fund to making further explorations of Pozo Ancho, and Capt. Tonkin estimated that this would require from 2½ to 3 years in time, and an expenditure of about 3000*l.* If all were lost they would still be receiving their regular dividends, and all that would be thrown away was the 90*l.* per annum which the 3000*l.* invested in Consols now produced. When they stopped the mine the 120 fm. level was poor, but if they went to the 135 they might find the riches come back, and there was certainly all the probability that it would be found there. At Alamillos they had for three years had very discouraging appearances, but they had now passed through the bad ground and come to the good again. He quite thought they should re-work the old Pozo Ancho, and the directors had full power to work it, but whenever they had entertained the intention of taking any steps which was beyond the ordinary ones they preferred consulting the shareholders. Their other mines were going on as well as could be desired. They were getting good profits, though the price of lead was not quite so high as it had been, and he might congratulate them that the dividend had arisen entirely from increased raisings at the mines. The proposed expenditure would not at all affect the accounts nor dividends from the other mines, from which they would, of course, be getting the same returns as at present, and which would assist them in replacing the reserve fund they were now about to employ. He concluded by formally moving that the report and accounts be received and adopted.

Mr. BALFOUR had much pleasure in seconding the resolution, and would take the opportunity of enquiring whether labour was any cheaper than when the Carlist war was going on, and also whether the railway was near completion?—The CHAIRMAN said that wages had been on the increase for the last 20 years, and they were paying 100 per cent. more than when they first went to Spain, but there had been no material rise during the past five years. The railway was nearly finished, and would probably be ready in a month or so. The advantage to the company was that a saving of 1s. 10d. per ton in carriage would be effected, but this was not all; the carriage by carts necessarily involved a loss of lead ore, which, although comparatively small, became an important item in the course of the year.

Mr. TAYLOR explained that the vein or lode in the mine forked, and formed two separate mines—Warnes and San Francisco—the veins of both those mines probably falling into the old mine; but they were at present lost in the soft uncongenial ground between the old mine and the new. The north, or San Francisco, is a small but very compact lode, and the prospects were so encouraging that they determined to sink Peill's shaft, which cost them a good deal of money; but it was sunk with great speed, both agents and men having shown great energy in the work. The drainage of San Francisco and Warnes was so connected that they did not doubt that San Francisco would take off much of the water, and enable the mine to be worked very cheaply. On the other mine, Pozo Ancho, they had a great deal of good machinery, and he believed that 20*l.* or 30*l.* would clean up and start the engine. At the 90 they were so poor that they were discouraged and stopped, though he did not know that they were open to the charge of cowardice in the matter. With the present price of lead, however, he thought they would do well to spend a little in further opening out that mine. Either of the three veins might now be expected to give them a fair return, and the advantage was that there would be no extra fixed charges. Quinientos had hitherto proved rather a bunchy mine, and in many parts the mine still looks well. He thought another year would put a much improved face upon the mine. The railway company had brought their line very near to Linares, and from thence to Alamillos there was a good level country to go over. They would have the railway right on their mine, which would prevent the loss from jolting the ore over common roads in wagons—this he estimated was at present not less than 5 per cent, and he hoped hereafter to get a siding into their smelting works at Cordova, when that loss would be, practically speaking, reduced to *nil*. It would also be a great advantage to them to be enabled to bring their coal from Cordova close up to their engines. He might also mention that they now adopted a different system in selling their lead; instead of forcing sales they left purchasers to come to them, and the result was that they got from 5s. to 10s. per ton better price. The Carlist war had really not affected them at all, as all the fighting had been in the North of Spain. The men at their mines were very industrious and sober, though not very strong, and Capt. Tonkin is much respected by the men. The company had never been in arrear with their payments for an instant, and the trust in Capt. Tonkin had been of great benefit to the company. Although the increase of establishments in Spain had raised the rate of labour, they had had no strikes of importance, and it had not brought about any real difference with the men. The company is paid in cash for all the lead sold, so that they did not run the risk of any heavy bad debts. He could assure them that they would avail themselves of all improvements with a view to swell their profits, and believed that the progress of Spain, even if it involved slightly increased taxation, would be beneficial to the company. Spain is undoubtedly improving, and there were now 500 olive trees where but one was 20 years ago; and when he told them that each olive tree represented a profit of 1*l.* per annum to the owner, they would understand the importance of this statement.

A SHAREHOLDER enquired whether there was not some mine in the neighbourhood which could be purchased instead of re-working the old Pozo Ancho?

Mr. TAYLOR did not think they could expend the 3000*l.* in any way with such prospect of success as upon opening up the Pozo Ancho. The Quinientos had not yet quite recouped them for their outlay upon it, but it would, no doubt, do so. The San Jose in the neighbourhood had made some good returns, but its prospects had not been such as to induce them to take it. Both he and his brother had seen many mines with a poor floor of ground and rich ore underneath, and there was no geological limit to the richness of ores in granitic rock, into which they were going, so that there were fair chances of success.

The report was then unanimously received and adopted.

Messrs. J. and R. Taylor were unanimously re-elected directors, and Messrs. Agar and Carter were appointed auditors, the proceedings terminating with the usual complimentary vote of thanks to the Chairman and directors.

FORTUNA COMPANY.

The half-yearly general meeting of shareholders was held at the offices, Queen-street-place, on Thursday,

Mr. ROBERT HENTY in the chair.

Mr. SWAFFIELD (the secretary) read the notice convening the meeting. The report of the directors (which appeared in last week's Journal) was taken as read.

The CHAIRMAN said he did not know there was anything more difficult than to continue in the strain of laudation, but he believed the last report received was at least equally as satisfactory as any received for some months past. As stated in the report, the directors congratulate the shareholders upon the continued prosperity of the undertaking. Not only had the profits for several years past been large, but the finances of the company have gradually improved. The profit for six months to Dec. 31 last amounted to 11,955*l.* 12s. 7d.; for the previous six months, 10,060*l.* 8s. 9d.: making in the year a profit of 22,016*l.* 1s. 4d. on the capital of 50,000*l.* It might be interesting to the shareholders to know that the mine had been in operation 20 years, and during that period had yielded 84,215 tons of ore, which had produced 58,950 tons of lead, of the gross value of 1,710,500*l.*; dividends have been paid amounting to 144,791*l.*, or 5*l.* 15s. 10d. per 2*l.* share. For some time there had been considerable difficulty in the finances, and 15,000*l.* was borrowed and repaid, and the company provided with abundance of capital; 20,000*l.* had been written off from profits to provide working capital; smelting works had cost 5000*l.*, the reserve fund had accumulated to 6000*l.*, and there had been no bill under discount for at least three years. He did think it hardly possible to find a mine in a more flourishing condition. To accomplish this there had been 11¾ miles of levels and shafts sunk to an aggregate depth of 4790 yards, or 2¾ miles; and winzes sunk 5390 yards, or 3 miles. This perforation, about 10 ft. by 6 ft., gave a height equal to extreme point of the Himalaya down to sea level. They employed two pumping-engines of 190 horse-power in drawing from five shafts, the quantity of water drawn was not less than than 203,000 gallons every day of 24 hours from a depth of 700 ft., and 4000 tons of coal were consumed every year; there were 500 hands employed. These figures showed what an enormous amount of work had to be done to produce such results. He then moved that the report and accounts be received and adopted.

Mr. JOHN TAYLOR seconded the proposition, adding that the Fortuna Mine was a strong instance of the result of perseverance. The company was in every respect in an admirable condition. They (the Messrs. Taylor) took no further credit to themselves than the persistent pursuit of a certain system of management—that is, making most of a mine both for the present and the future. He explained the position and prospects of the several mines, stating that the returns of ore had been kept up regularly without diminishing the reserves. He congratulated the shareholders upon having a very good mine.

The reports and accounts were received and adopted.

Messrs. Robert Henty and J. R. Peill were re-elected directors, and the auditors were re-appointed.

Thanks were voted to the superintendent and agent at the mines, and a vote of thanks to the Chairman and directors closed the proceedings.

ALAMILLOS COMPANY.

The half-yearly general meeting of shareholders was held at the company's offices, Queen-street-place, on Thursday,

Mr. J. PHILLIPPS JUDD in the chair.

Mr. H. SWAFFIELD (the secretary) read the notice convening the meeting, which was then declared by the Chairman to be duly constituted, and the reports and accounts were taken as read.

The CHAIRMAN, in moving the reception and adoption of the reports and accounts, said that he had never, since he had had the honour of being their chairman, appeared before them with more pleasure and greater satisfaction, their report being of a highly gratifying character as to the position of the property. The explorations now being made were constantly extending, were yielding good fruits already, and the raisings will be such as to enable them to go on without trenching upon their reserve fund. They would recollect that it was anticipated that they would have to expend 1000*l.* of their reserve, but their prospects were now so good that this would be unnecessary, and at the same time they would be able to do this without lessening the distribution of profits. Their reserve fund was of good amount, and would continue available. As to the mining operations, he did not pretend to be a miner, and knew nothing about that part of their business, but Mr. Taylor would give them all the particulars they might desire. He would mention that he had that day stated at the board that he would have to place certain shares upon the market which had come under his control as an executor, and the result was that two offers were at once made of higher prices than were quoted in the market—an evidence of the opinion of the directors as to the permanency of the property. He had on previous occasions been charged with stating their position *coul'eur de rose*, but he thought there would be no more complaints in that direction, as the property really appeared to be turning out *essence de rose*. He conluded by formally moving the resolution.

Mr. BALFOUR seconded the motion, which was then put to the meeting and unanimously agreed to.

Mr. TAYLOR said that he, equally with the Chairman, had pleasure in congratulating them upon the appearances of the mines, which were better than he had ever seen them, and this was entirely through continuing exploratory operations or tutwork through good times and bad times. He heartily despised those who pretended that they could determine how long a lode would continue or what it would be worth, for no one could see an inch farther into the ground than anyone else, and anyone in that room was quite as competent to make an estimate as he. It was only by keeping up regular explorations that they could hope to secure permanency in a mine. The map before them represented 1¼ or 2 miles of ground, and their shaft in the centre—Taylor's shaft—happened to be put down in not very rich ground, although they had found some rich ore on the right and left of it. The lode then became disturbed by a slide, which much disordered it, and lessened its value, but they had now got under, and out of the effect of that, and the lode was improving in productiveness. They hoped that hereafter the lodes would approximate each other, and, as they had facilities for handling 300 tons per month, the time might come when the profits even of the Linares might be surpassed. The ore was very good, producing about 77 per cent., with a fair proportion of silver. They made two qualities of Alamillos lead, desilvering one and enriching the other to about 29 or 30 ozs. of silver per ton; the former had met with a ready sale during the war, but he feared the bullet trade would now be interfered with. Affairs in Spain, however, looked very encouraging, as there was a good prospect of heavy crops and cheap food.

Messrs. J. P. Judd, R. Henty, and J. Taylor were then re-elected directors; Messrs. E. J. Binney and W. Carter were re-appointed auditors; and the proceedings terminated with usual complimentary votes to the Chairman and directors.

GREAT LAXEY MINING COMPANY.

The half-yearly general meeting of shareholders was held on Wednesday, at the London Tavern,

Mr. GEORGE W. DUMBELL in the chair.

The notice convening the meeting having been read, and the managers' report having been taken as read, Mr. W. ALLEN (the London secretary) read the report of the directors, as follows:—

In reporting to their fellow shareholders at this ordinary half-yearly meeting a statement of the company's affairs, the directors have a comforting assurance that the steady prosperity of a mine, with regular payments of good dividends, a fact which generally give satisfaction to all parties concerned in speculative undertakings. The statement of accounts now under consideration only comes down to Feb. 4 last, immediately after payment of the January dividend. Upon a full examination it will be found to compare favourably with former half-yearly balances, and it is very satisfactory to find that in the general cost of the mine there is a reduction in the half-year of 1886*l.* The produce of the mine since Feb. 4 has been steadily good, and the directors yesterday declared a quarterly dividend of 8*s.*, with a bonus of 2*s.* per share, payable in 14 days, being at the rate of 50 per cent. upon the capital of the company, and also carried 1000*l.* more to the reserve fund, which now amounts to 6500*l.* The directors, acting under the authority of the special resolution of the shareholders, have sold that portion of the company's sett called Glenroy for the sum of 4000*l.*, of which 1000*l.* has been paid as a deposit, and the balance is payable upon the property being made over to the purchaser. The directors having given notice of their intention to bring before this meeting a question as to the advisability of obtaining the assistance of steam-power to facilitate the delivery of the company's ores when sold, now request the earnest consideration of this meeting to the matters, which is of urgent importance, and they are prepared to submit to the meeting a resolution upon the subject. It is with extreme regret the directors refer to the death of Capt. John Cornish after a very short illness. Capt. Cornish was a thorough practical miner, with abilities far above the average of miners, and combined great perseverance in carrying out the skilful operations he devised with unswerving honesty. It is not easy to make up for the loss of such a man to a great company. Capt. Reddicliffe has succeeded to the situation of chief manager, and Captain William Henry Rowe has been appointed second manager, and the directors have every reason to expect the present managers will well and practically carry on the mine. The directors have deemed it advisable to appoint an underground overseer, the great extension of the mine in depth and length requiring more continual supervision than the manager could give to that part of the work. Mr. John Killip, who has been appointed to this situation (now in the prime of life), was entirely brought up as a miner at Great Laxey, is well acquainted with every part of the works, and is a man of unimpeachable character. The directors have a further painful duty to discharge in announcing the death of Mr. James Haining, who has filled the office of professional auditor of this company ever since it was formed, and for many years to the former company also. Mr. Haining was not only an able accountant, but also sustained a character of the highest standing for honesty and propriety of conduct. The directors being compelled to replace Mr. Haining, were most fortunate in obtaining the services of Mr. John Goldsmith, a person of great experience and high standing; they now seek that appointment to be confirmed, and that Mr. Goldsmith continue in office until the general meeting of the company in October next. In conclusion, the directors congratulate the shareholders at large upon the appearance of long continued prosperity in the Great Laxey Mine.

The CHAIRMAN said: Gentlemen, although we are a very small meeting here to-day, I think that it is not a bad sign, but a very good one. (Hear, hear.) For if there were much to be dissatisfied with it would be very right that the power of the shareholders should be here, in order to control what they might think was faulty in the directors. Whether the directors do the best they can or not it is not for me to say. I believe they do: but, at all events, the mine does the best it can, and that is the most material and essential point the shareholders have to look to, and I think Great Laxey, taking it for any series of years past, will compete with any mine in the kingdom; and though, no doubt, there may occasionally be circumstances that render it impossible to pay the usual dividend, though there may be very possibly from time to time an alteration or a change in the mine, and though there may be, as we know there was, a strike among the workmen, which for many months prevented our going on with the undertaking at all, yet I believe there is in Great Laxey an almost inexhaustible store, continually being developed by the regular working of the mine. (Hear, hear.) But you must not stand still in working that mine, you must be continually sinking and continually driving to open new ground. For there is no question of doubt that the managers might just sit still and for a length of time they might continue to make good returns by taking out what there is already discovered; but if they did so the result must be ruinous in the long run to the shareholders, when they came to want the resources and to want the reserves, which they ought always to keep in store. (Hear, hear.) Gentlemen, the directors have told you by their report that upon a full examination the half-yearly account will compare favourably with any preceding half-years. Now, I wish to show you that it does do so; and perhaps you will take these figures more particularly, because it more concerns the absent shareholders to know exactly what the accounts really show. In August last—that is in the half-year ending August, 1875—we paid 14,500*l.* in dividends and towards the reserve fund. In February, that is in the half-year ending February, 1876, and to which period the accounts before us relate, we paid 16,500*l.*; in other words, 2000*l.* more than in the previous half-year. In August last the balances were 11,642*l.*; stock, 11,410*l.*: making a total of 23,052*l.*, after having paid, as I told you before, 2000*l.* less than in the succeeding half year. In February last the balances were 7954*l.* and 14,641*l.*, making together 22,595*l.*: add to that the 2000*l.* paid beyond the previous half-year, and you have 24,595*l.*, as against 23,052*l.* I think, therefore, we are correct in stating that the past half year's accounts will compare favourably with the previous half-year's accounts. ("Hear, hear," and cheers.) Then, gentlemen, you will find that we have paid during the past year actual payments to the shareholders and additions to the reserve fund, 31,000*l.*; and you will also find from the accounts that the balance—the actual amount in hand on Feb. 4 last was 7900*l.*, making a net profit of 38,954*l.*; or, in round numbers, 39,000*l.* for the year. (Cheers.) Then, gentlemen, you will bear in mind—and I remember being here at a very large meeting when a gentleman who has since passed away, a shareholder, said that rather than submit to the directors declaring a dividend he would file a bill in the Court of Chancery to get an injunction against their doing it; and this shareholder added, "Now, look here at your accounts; you have only so many thousand pounds in hand, and yet you pretend to declare a dividend, as you say you have done, to day." But the gentleman, who was very much excited, forgot totally that these accounts only go up to the beginning of February last, and, therefore, there is all the working of February and March, and up to April 11, to be added to that amount, out of which we pay our dividends, and out of which we take the sum placed to the reserve fund. Now, I am very pleased to tell you, gentlemen—and it will go forth at the same time to the absent shareholders—that the produce of the mine since Feb. 4 has been most satisfactory, and that after the payment we have taken into account, and we have calculated all the liabilities that we are aware of against the company up to April 11—that is, yesterday—and we have put in a little sum of 1000*l.* to cover anything we did not know of—well, after doing that, and after payment of this 850*l.* (which is 6000*l.* for the dividend, and 1500*l.* for the bonus, that is 7500*l.*, and 1000*l.* more to the reserve fund) we have a balance of 6967*l.* (Cheers.) I think, therefore, gentlemen, that you will see we have not strained the resources of the company, and we have not exceeded that which prudence would dictate to any directors in declaring the usual quarterly dividends, which amount to the sum of 7500*l.* (Hear, hear.) Now we have also mentioned to you in our report that we have by means of a reserve fund, which ought to have been established or commenced to be so from the very origin of the company, and which our articles particularly state might be done, but which never was done; we have, I say, by this means still further secured the position of the company. And that reserve fund I am happy to say, clear and free from all these balances and payments, now amounts to 6500*l.* (Cheers.) Now I am perfectly satisfied that no more wise course could have been taken than commencing that reserve fund, but I do remember some two years ago—it is just exactly two years—when there was a very large and not very quiet meeting in this room, a gentleman, closely connected with myself by marriage, was present, and when he suggested that we ought to have a reserve fund there was a general outcry, and you would have supposed he was going to propose some marvellous and outrageous thing. Shareholders said, "reserve fund indeed, why there is not money enough to pay the proprietors," and it was useless for the proposer of the suggestion to urge, as he did, that the company would never be right until it had a reserve fund. Now we see the advantages resulting therefrom. It was not established then, however, you might as well have tried to turn the Thames from its course as the views of the shareholders at that meeting, but subsequently the proposition then made was carried into effect, and though that was only a short time ago you see the progress that has been made in that direction. Now I shall bring under your notice under a separate resolution presently a question that has been raised with regard to the employment of steam power for the delivery of ore. I think that a very considerable portion of our success has been due to the sale of our ores for actual delivery, and that without that we could not have commanded the market as we have done. As you are all aware we sell our lead by tender. We send out samples to all the smelters, accompanied by a certain price, within which they are to send in their offers, and then the tenders are all opened on the following day, and the purchaser declared. And since we have adopted the principle of delivering the ores, we have had parties come in—some of them we considered our best and largest purchasers—who would not bid before at all. We have done that by means of a small steamship company that was created for the very purpose. That steamship company is now about being wound-up, and we shall lose the benefit entirely of that. Now, the directors being perfectly sure that if they go back to the old system of selling for the purchaser to take the ore away from Laxey whenever he can do so, propose that they should be authorised by the shareholders to take such steps as may best meet the present circumstances. We might, perhaps, have taken upon ourselves to do it without authority (but I am sure that I would not agree to such a course, nor would any one of the directors), because it is simply carrying out the operations of the company just the same whether we deliver the ore into a vessel at sea, or at the wharf of the purchaser; but still it is, we think, a question for the shareholders to decide, and we consider it would be most advantageous to the company at large for the directors to have power to supply the want that within a few days will be created. We propose to do this, first by providing some temporary assistance, and then either to purchase or have built for the company a proper steamer for the benefit of the company at large. I would myself, I confess, greatly prefer a steamer built for the purpose, and I am sure, when addressing my friend opposite (Capt. Macgregor), he will understand me fully when I say there is no question of doubt that no ordinary steamer is a fit and proper vessel for taking cargoes of ore. I am quite satisfied that that is so, and that we ought in the interests of the company to have a vessel built for the express purpose, and that while she must be made remarkably strong, she must also draw little water, for our port at Laxey is a very difficult one to manage at all. At a time when we are considering and discussing this question I am uncommonly glad to have the presence of our friend, Capt. Macgregor, who, being a sailor himself and familiar with the trade and the port I am now speaking of, will be able, if I make any mistake, to correct me for the benefit of this meeting. Therefore, gentlemen, you may take it for granted that if I am not correct the facts are as I state—viz., that we experience great difficulty in shipping our ore for delivery, as we have arranged, owing to the natural difficulties in the way of any vessels approaching the port of Laxey, except those which are specially built for the trade, and consequently in the absence of such specially adapted vessels, we have the utmost trouble to charter ships in Douglas for the transport of our ores.

A SHAREHOLDER: Do the Articles prevent you owning a ship?

The CHAIRMAN: Oh, no; for we should purchase or build a vessel simply for the purpose of carrying out the working of the mine. Then you will observe that if we do have a vessel laid down we have 6500*l.* in hand towards its cost, and before such a vessel would be completed and delivered to us we should have money in the reserve fund sufficient to pay for her without touching one shilling of the profits expected by the proprietors. Now, our object in proposing this arrangement of the matter is that we shall thereby obtain additional property for the company without stopping one shilling from the shareholders. (Hear, hear.) Now, we shall presently bring before you a resolution upon that subject, and it will be in the power of the shareholders either to adopt that resolution or to ignore it altogether. We have referred in our report to the loss of our managing agent at Laxey, and it is not necessary for me to say more than that I thoroughly endorse every word that has been said here, and I think that nearly every shareholder in the company knows that the energy of that man was of immense importance and advantage to us. He came into the management of Great Laxey at a most critical time. He was opposed by all the great body of men that had been on strike, and it was only by the most indomitable courage and resolution that they could not shake, and could not turn him from his course, that at last (which was not very long after he first went there) he was thoroughly the master of the situation and of his men, for they knew that when he directed a thing to be done it was to be done, and that he would be obeyed, unless some good reason showed him that he was wrong in his judgment. We have lost him very unexpectedly, and my firm belief is that he shortened his life by his over energy in the service of the company. To attempt to go over the mine now from the extreme south to the extreme north is more than any man ought to do in one day. It is not usual to do it, for it is divided into two days' work; but Captain Cornish, with an over zeal, and with a desire to save time, unfortunately went through the whole of the mine one day, and I do not believe he ever recovered the excessive fatigue that therefrom ensued. I believe it was the foundation of his illness and death. He ruptured a blood vessel, and we thought he was recovering from that, when a relapse took place, and he died. We have appointed Capt. Reddicliffe, who is the second agent, to replace the loss of Capt. Cornish. I believe that he will do everything that man can do for the benefit of the company, and that he is strictly and correctly as honest and conscientious a man in the discharge of his duties as you could ever meet with. We have appointed then as second agent Capt. W. H. Rowe, and I may say that he has not been appointed without our having a thorough knowledge of him. He was for some years the manager of an extensive mine—the greater part of which belonged to myself—in Ireland, and I believe, and I may say I know, him to be not only a clever man and an admirably good draughtsman, but that he will not be party to anything that is either dishonest or dishonourable, or any quackery that may be put forth in order to bolster up the mine, and make things, in the statements laid before the directors, appear better than or different to what they really are. (Hear, hear.) I believe that we are fortunate in having got a man who is thoroughly to be depended upon. We have then thought it needful and advisable—the mine having been so much extended in depth and length each way—to have an underground agent in addition to the two managers, whose business it shall be to be—in fact almost to spend his life—underground. The men will never know where he is to be found, or where he will appear from day to day, and by that means he will be able effectually to check the working of the mine, and if he finds anything wrong to check the men, and to report them to the managers. In selecting a man for that purpose we exercised the utmost care and judgment, and in appointing Mr. Killip to that position I do not think we could have fixed upon a better man. He has been brought up at Great Laxey from a boy, has passed 16 years underground as a miner, and is now in the prime of life. He was persuaded to take the management of a co-operative store at Laxey. He did so for some time, and he discharged his duties to the great satisfaction of all parties concerned, and his departure was greatly regretted. But as he told me when I offered him the appointment of underground overseer, "The honest truth is I am not comfortable, the parties I work for are satisfied, but I never feel at home. I was brought up in a mine, and I never feel at home away from it." It was something like a sailor trying to take a situation on shore. And this man is the person we have selected for the appointment of what we call underground overseer. I believe that he will save the company more than anything else we could possibly have done so far as the general prospects and working of the mine are concerned. Now, we find in taking the monthly pay-sheets that there are men who are very

well paid—the average are very well paid, but you will also find amongst those men that some of them are not entitled to anything at the end of the month when you deduct the expenses they are bound to pay for powder and candles. The explanation of that is this. We require from the managers an account stating the reasons of the high pay of some men and of the low pay of others, and what are the reasons? Simply these. The ground sometimes turns very much, as it is called, against the men. For instance, sometimes the ground will be set at 6*l.* to 8*l.* a fathom to drive, and instead of continuing in the state it was at the time the bargain was made it will involve double or treble the expense to work it as before, and that is given as the reason why those men had not made wages. But, on the other hand, the ground sometimes changes greatly in favour of the miner employed in driving it, and he will make very large wages. For instance, it does occur sometimes that a party taking a bargain breaks into a loch—called in Cornwall a vugh—that is, an open piece of ground in the drivings, and there will be fathoms of ground all open. That is, of course, greatly in favour of the men, but if it is in favour of the men, it is in favour of the masters too. These lochs are almost always full of ore, and it is one of the most beautiful things any man can see to go into one of these open spaces when a miner has broken into it. Then there are a third set of men—those who have made little or nothing. Why? Because they would not do their work—their daily work—as they ought to do, and, therefore, they do not get their wages. Now, all these things are accounted for in writing by the managers to the directors every month, and a sheet is left with me by the secretary showing exactly all the workings, high and low. Therefore, it is satisfactory to know that we have a man, as we now have, as underground overseer who will be a check upon the men as no manager can, because I defy managers, whatever zeal they may feel for the company, to keep a thorough check on all the men employed by them. Physically they would be incapable of going day by day underground; and, moreover, if they did so, the general work would be left undone, because it is not only underground that the managers must be, for they have to overlook the operations throughout the whole of the works, on the floors, and over everything, in fact, connected with the company. Therefore, I feel we have done a wise thing in appointing that underground overseer, and that it will result greatly to the advantage of the company. (Hear, hear.) Now, I do not know that there is any other point I need call your attention to, except, indeed, that I should state that not only did we lose last year the manager of the mine, but we also lost a gentlemen—Captain Macgregor for one was well acquainted with—Mr. Haning, our professional auditor ever since the company was established, and for many years before. He was called away unexpectedly, and we cannot possibly go on without somebody in his place. We have selected a person who is also very well known to my friend opposite—that is, Mr. John Goldsmith. He is well qualified to discharge his duties of his office, and we seek, as you are informed by the report which we have brought before you, to have his appointment confirmed until October next, which will be the proper time for considering the question of the election of auditors of the company. I do not know that there is anything else I need refer to until we come to pass a special resolution in regard to the proposed steamer. I will, therefore, now conclude by moving "That the accounts, together with the directors' and managers' reports, be received and passed, and that the report of the directors be printed, and a copy forwarded to each shareholder."

Mr. F. W. PRICE: Can you afford us any information respecting the sale of the Glen Roy?

The CHAIRMAN: Certainly; I should have said something about that point. We were authorised, you will remember, by special resolution of the last meeting of the shareholders to sell Glen Roy. We did not advertise the property; we did not spend a shilling in that way, but we let it be known among those likely to enter into that kind of speculation that Glen Roy was for sale. Shortly after we were called upon to state the price, and we fixed a price that we did not intend to depart from, and when asked to take a less price the simple answer was "No, we will not take a less price than 4000*l.*" After some little time it was agreed to purchase the property for that sum—4000*l.* We then fixed upon a boundary line shutting it off most thoroughly from Great Laxey in every possible form, so that they could not by any means come into contact with us. Having gone through those preliminaries we submitted the agreement to the intending purchasers, and they agreed to pay down the deposit we required of 100*l.*, and we said that if they wished they might pay the other 3900*l.* by bills, that we should be satisfied with at six, nine, and 12 months, but that those bills were to bear interest at the rate 6 per cent. from Jan. 30 last. The 100*l.* was paid, and I am told the parties will not take advantage of the credit allowed them, because they do not want to pay the interest, but that they will pay the 3900*l.* as soon as the title can be made correct. We had then to apply to the Office of Woods and Forests for authority to sub-sell that part of our property, and the parties also applied to the office of Woods and Forests for terms better than we get as to royalty. We, as you know, pay a very heavy royalty, and of course no man would embark in an untried undertaking, the future of which was uncertain unless specially favourable terms were allowed. I understand that the office of Woods and Forests have come to terms in regard to Glen Roy, which will be conceded as soon as the surrender is perfected. This will be prepared by the solicitor to the office of Woods and Forests for us to execute, and then the balance will be paid over in bills or cash. I can only add that I gave notice to the parties that if the payment were made in bills they must be on parties whom we felt thoroughly satisfied were beyond suspicion, and that if we were not satisfied in that respect that we must have a bankers' guarantee, so that as far as it is possible we shall be perfectly safe. (Hear, hear.)

Mr. F. W. PRICE: What will be done with the proceeds of the sale?

The CHAIRMAN: I cannot tell you exactly what will be done with the money, but I will tell you what we propose to do with it. We propose to place 2000*l.* to the reserve fund and 2000*l.* to the general account. I think that will be the best and fairest course to pursue. (Hear, hear.)

Mr. WHITEHOUSE begged to second the resolution for the adoption of the report and accounts.

Mr. PETER WATSON (director) thought it must be very satisfactory to the Chairman, who had been something like 43 to 45 years connected with this property, to meet the shareholders this day, and to submit for their approval such a satisfactory statement of accounts, and such a satisfactory report from the managers of the mine. They might take it for granted that the small size of the meeting very clearly and firmly indicated the satisfaction felt by the proprietors in the present state of things. Hear, hear.) The accounts and report which had been circulated, giving as they did almost all the particulars of the property, had evidently assured the shareholders' minds as to the soundness of their position, and the brilliancy of their prospects, at the same time it had been very satisfactory to hear the statement made by the Chairman, first in regard to the financial position of the company, and next as to the dressing-floors, and then carrying the meeting into the bowels of the earth and showing them the magnificent sights which gladdened the eyes of those who explored the depths of Great Laxey. It was really wonderful to behold the great deposits of lead in this mine. Of course 50 per cent. dividends were not always obtained, particularly at the present time by investors in public companies; but they were paying dividends at the rate of 50 per cent., while there was the comforting reflection that it would be possible to distribute larger returns if all profits were divided. (Cheers.) As the Chairman had informed the meeting in addition to paying 50 per cent. dividends the company had succeeded in accumulating a reserve fund of 6500*l.* In regard to that fund there was one thing he desired to point out. It would have been observed that a portion (3000*l.*) of it was invested in Consols. Now, he did not know of any lead mining company in this country that had so large a reserve as they had, and very few had any at all. It would be remembered the company had started in 1863—13 years ago—with a capital of 6*l.*0·0*l.*; since then the shareholders had received 19*l.* 13*s.* (say), in round figures 20*l.* per share, or in the aggregate, 300,000*l.*; while, estimating it roughly, it might be said that the value of the property in the market stood at another 300,000*l.* Thus, in 13 years the shareholders had received (paid over and in hand) 600,000*l.* for the 60,000*l.* they had originally laid out. (Cheers). There were very few mines in this country which stood, he thought, as well as the Great Laxey did at the present time. He only wished that the British public would lend a little of their money to the development of the resources of this country in the way of mines—more especially lead mines—rather than embark in the wonderful undertakings that came from across the Atlantic. He trusted that the extraordinary disclosures of the last few years, particularly the last 12 months, in regard to those enterprises had opened the eyes of investors to their real merits. Distance, it was said, lent a charm, and hence, he supposed, the enormous amount of money sent abroad to develope the mineral wealth of foreign countries. If the capitalists of this country would interest themselves in the development of the riches undoubtedly existing in the bowels of the earth at home, they would, he thought, find that a much better field for the investment of their money than venturing in foreign mines. But unfortunately it was not in that way alone that England had of late suffered such great pecuniary loss; the depreciation in foreign securities alone amounted to something like 300,000,000*l.* Such a loss as this must, indeed, be very hard for our country to bear. How much better would it have been for everyone had that money been applied to the development of home resources. When they regarded what had transpired in the case of the securities of Mexico, Honduras, Paraguay, Turkey, and Egypt, and when they listened to the sad tale told at yesterday's meeting of Peruvian bondholders, everyone must be struck almost with disgust that they had ever invested their money with foreign nations. (Hear, hear.) Returning now for a moment to their investment in this mine, the Great Laxey. There was one point, a most vital one, which the Chairman had not referred to. In addition to the financial statement which had been circulated among the shareholders was the report of the managers, which showed that that they had not been working out the ore of the Great Laxey unjustly or unfairly, as the following remarks of Capts. Reddicliffe and Rowe made towards the conclusion of their report clearly indicated. They said—"Before concluding this description of the underground workings we would observe that the ore ground opened in driving the levels during the last six months is quite equal to what has been stoped out during the same period, therefore the reserves are not less than they were." Such a statement as that, informing them that the mine was being worked fairly and legitimately, was exceedingly satisfactory; but the concluding words of the report were even of a more gratifying and encouraging character. They alluded to the improvements which in this, as in all other large works, were constantly necessary. In regard to that matter he might state that on visiting the property in October last he had been extremely pleased and gratified with the progress that had been made in this respect—that was to say, towards the improvement of the dressing-floors, &c. Capts. Reddicliffe and Rowe in regard to this point said—"We still continue to make additions to and improvements in our dressing and other machinery. There still remains much to be done in this direction, but we have no intention of relaxing our efforts to make Great Laxey in all departments second to no mine in the kingdom, a credit to the employees, and a profit to the shareholders." He thought those few lines in the report which he had just read must be as satisfactory to the shareholders as the receipt of their dividends. At all events, he felt sure the directors had very good reason to congratulate the proprietors on having such a valuable property as this, and he confidently hoped that it would long remain in its present prosperous condition.

The CHAIRMAN: Gentlemen, I may add one word. We sold yesterday 100 tons of lead for 3857*l.*, and to day we have sampled another 100 tons, which we expect will realise the same sum. (Hear hear.)

Capt. MACGREGOR said as a shareholder for at least the last 10 or 12 years he had been in the habit of visiting the property occasionally, but he did not remember ever before seeing such rich stones come up as he did last Friday. He could not answer for what was underground, but he could certainly testify to the great richness of what he saw. (Hear, hear.)

The resolution for the adoption of the report and accounts was then put and carried unanimously.

The CHAIRMAN: Well, gentlemen, I have already said as much as I think it is needful to say with regard to the proposition of the directors as to purchasing or chartering, or otherwise obtaining by any means not dishonest, a steamer. We are about to lose the benefit of what we have had for some little time past, and I beg to propose this resolution—"Resolved that it is advisable to provide steam-power to facilitate the delivery of the company's ores, and for this purpose the directors are hereby authorised to provide a proper steamer, either by purchase or having one built, and in the meantime to charter a steamer if they think it desirable, and the directors may employ the reserve fund to carry out this arrangement." Now, I have referred to the reserve fund particularly, because although the directors, if they had the authority of the shareholders to obtain the steamer, could have employed the reserve fund without it being mentioned in this resolution at all, I think it better to do so for two reasons. First of all, it will show the shareholders that we do not seek to reduce the dividends at all in order to purchase this steamer; and, in the next place, it will show them that we do not want to absorb the reserve fund for this purpose without having named it to the shareholders, and having obtained their approbation (if we obtain it) to this application of the money. (Hear, hear.) Because I think it advisable if we do build a steamer, or purchase one—I incline to the former course—that we should be able to pay for it without interfering with the regular distribution of the profits among the shareholders. (Hear, hear.) Therefore, I beg leave to move this resolution, and if it is adopted I think we shall not have reason ever to regret it.

Some discussion then ensued on this subject, and in answer to various questions, the CHAIRMAN said that it would be the duty of the directors to record the operations of the steamers in an entirely separate account. Of course, the ores shipped in her would be entered as part of her earnings, just as the company paid for them now. And not only the freights paid by the company for the carriage of its ores, but all other earnings (because it was expected that the steamer would obtain return and occasional freights) would be charged to the credit of the steamer. This account would be submitted to the shareholders in the regular way at the close of each half-year, and from that they would learn the result of the past six months' trading. He believed the result would be this, that before many years were over the steamer would stand free and clear as an asset of the company, while the reserve fund would have had restored to it the sum which it had advanced for the purchase of the vessel. (Hear, hear.) It would be necessary that great care should be taken in obtaining a vessel perfectly suited in strength and draught for the description of cargo it was intended to carry, and hence he was of opinion that the best and surest way of obtaining what they wanted would be to build their own vessel.

Capt. MACGREGOR, in seconding the resolution, which he did with much pleasure, expressed the hope that the company would be successful in getting a strong and proper vessel for the purpose intended. He corroborated the statement made by the Chairman as to the difficulty of chartering vessels to Great Laxey, owing to the shallowness of the port, and said he felt confident the course now proposed would result advantageously to the company, it being a well known fact that better prices could be secured for their produce if its delivery were assured.

The CHAIRMAN, in reply to further questions, said he should expect the cost of the vessel to be about 8500*l.* He would not recommend the company to purchase a second-rate vessel, or any one just picked up, because it was a most dangerous cargo for any but specially constructed ships. With regard to the payments, assuming the cost of the vessel was 8500*l.*, they had already in hand as reserve 6500*l.*, which, with the 2000*l.* they proposed to add from the sale of the Glen Roy, would be sufficient to meet this outlay. The tonnage of the ship would probably be between 300 and 320 tons. They sometimes sent a single cargo of 100 tons of lead, but then they filled up the remainder of the vessel with blende, which they did not sell by tender at all. Then it was expected that the vessel would be able to earn return freights from Liverpool to Douglas, on such cargoes as coals, for instance. As illustrating the absolute necessity of having such a vessel as that proposed, he might mention that on one occasion lead purchased from the company was lying four months at the mine, it being impossible to transmit it. Naturally, when such a contingency was to be apprehended parties would not bid for it in the same way as if there was a certainty of the ore being delivered within reasonable time.

Mr. J. D. ROGERS (secretary at the mine) said, in answer to questions, that the vessel the company had at present in working was manned by 13 hands. It was 320 tons dead-weight cargo capacity, and had been built for this trade. The company who owned it had been particularly unfortunate, having lost two of its vessels, the first of which had not been insured, and it was about to be wound up. There was no question but that this matter of transport must be undertaken by the company if it were to retain its present prosperous position. He did not entertain the smallest doubt as to the result in a pecuniary point of view—undoubtedly the vessel would pay the Great Laxey much better than the Laxey Steam Ship Company. He grounded this confident opinion on the freight the vessel would earn and its probable cost. The return upon its cost would be, he estimated, about 15 per cent.

Mr. P. WATSON pointed out that if they left their money in Consols they would get about 240*l.* or 250*l.*, whereas if they invested it in this steamer as proposed the return would probably exceed 800*l.*, but the shareholders must look even beyond that, and consider the benefits to be derived from the possession of a steamer especially suited for the carriage of lead ores—benefits that would accrue in the shape of the enhanced prices they would be able to obtain if there existed anything like certainty as to the delivery of the produce. (Hear, hear.) And this, the prompt delivery of their ores, was a most important consideration with purchasers, for owing to the rich quality of the produce from Great Laxey it was very extensively used in mixing with ores of inferior grades.

Mr. ROGERS corroborated what had just been said as to the extensive employment of Great Laxey ores for mixing purposes, and that, therefore, it was most material the delivery of the produce should be prompt and certain.

The resolution was then put and carried unanimously.

The CHAIRMAN: Gentlemen, I have very great pleasure in proposing that the thanks of the meeting be given to our managers, secretaries, officers, and auditors for their conduct of the affairs of the company. Without able and faithful managers we could do no good whatever, without the officers appointed under them the directors would be hopelessly helpless, and without the assistance of the auditors, which is given in the best possible spirit, in order to enable the accounts to be continually overlooked, we should be also entirely at a loss in coming before you. Therefore, I have great pleasure in proposing this resolution.

The proposition on being seconded was put and carried unanimously.

On the motion of Mr. F. H. TURNER a cordial vote of thanks was accorded to the Chairman, and Mr. DUMBELL, in acknowledging the vote, said he would avail himself of this opportunity of thanking the numerous shareholders who kindly forwarded to him their proxies for their continued confidence.

The proceedings then closed.

NORTH LAXEY MINING COMPANY.

The general meeting of shareholders was held at the offices, Austinfriars, on Tuesday,—Mr. WILLIAM JARDINE in the chair.

The LONDON MANAGER read the notice convening the meeting.

The accounts showed a balance of assets over liabilities amounting to 1488*l.* 17*s.* 8*d.*

The following directors' report was read:—

The report of Capt. Rowe having been circulated with the accounts, your directors hope you will consider it satisfactory. At the last general meeting your directors referred to the improvements in the mine, particularly in the deeper levels, and they said that they were anxious to be in a position financially to resume sinking the north shaft. For this purpose they offered to the shareholders generally some of the unissued shares, which were almost immediately taken (more than half being subscribed for by the members of the board). Owing, however, to dry weather it was impossible with the pumping-wheel to keep out the water from the bottom of the mine, and the sinking below the 121 could not be commenced till August. Since then it has been sunk about 13 fms., and as the shareholders have been informed, the lode has shown a most marked improvement in size and productiveness—having increased from a few inches to 4 ft., and valued at one time at upwards of 1 ton per fathom—auguring well for the results of driving the next (136 fm.) level. In order to provide against the frequent interruptions hitherto experienced in carrying on the operations, your directors lately decided on purchasing a steam-engine to use as an auxiliary power in cases of necessity, and they have been fortunate in acquiring one in the immediate neighbourhood on very moderate terms, saving also much time as well as expense in carriage. Steps have already been taken to remove the engine and erect it at the mine. Your directors look forward with considerable interest to the future opening of the mine, and believe discoveries of importance will be met with at no distant day. Every exertion will be made to push on the works as quickly as possible. According to the accounts it will be seen that after providing for the new machinery, and a quantity of pumps, timber, &c., there is a credit balance of 1488*l.* 17*s.* 8*d.*, irrespective of another 30 tons of lead ore, for sale on the 21st instant. Your directors have to report with much regret the death of their late colleague and Chairman, Mr. W. C. Buller, whose attention to the interests and business of the company was unremitting. The board have elected Mr. G. W. Blogg to the vacancy thus created, and Mr. S. W. Daukes in place of Mr. T. H. White, disqualified. At this meeting two of the directors, Mr. Geo. W. Blogg and Mr. S. W. Daukes, go out of office, but are eligible for re election, as also the auditors, Messrs. Brandt, Stansfield, and Co.

The report of Capt. R. Rowe (the manager) stated that—

The principal point on which to speak is in reference to the sinking of the north engine-shaft, and on the advisability of persevering with the further sinking of the same with the utmost dispatch. In the report of April 10 last year he stated that "the sinking of the north shaft ought to be proceeded with at once by a full force of men, and carried down 15 fms. before driving out a fresh level." Owing, however, to the summer season, the water in the bottom of the mine prevented our resuming the sinking below the 121 fms. level, before August last, when we started with a strong force of men, and the shaft is now down 12½ fms. He now repeats what he stated in his report to the London manager on Feb. 12—viz., that when we began to sink the shaft below the 121 fm. level, the lode was nipped, and scarcely recognisable; but after sinking about 4 fms., it commenced to widen, and simultaneous with the widening ore came into the shaft, and the lode from almost nothing increased to and has maintained the size of from 3 to 4 ft. wide, carrying ore always, but variable in extent and value. The cause of this has been manifest—the lode has had to contend with successive horizontal beds of hard quartz rock, keeping it in a continuously changeable and disordered state, but which I firmly believe will be overcome, and in clearer and more settled strata will be found more productive, and abound in large and steady deposits of ore; for this reason I still wish, before driving out a new level, to adhere to my last year's report, wherein I advised a depth of 15 fms. before driving out fresh levels.

In the 121 fm. level they have ore ground proved and driven through for 20 fms. in length north of the shaft, worth from ½ to 2 tons of leed ore per fathom, and the end is still in ore; south of the shaft the level is driven 12 fms., and for the last 5 fms. the lode has averaged nearly 2 ft. wide, and although not to value, the stuff has had to be saved for the washing floors, and is a decided improvement to the levels above. The 84 fm. level is the one they have during the year chiefly persevered with by pushing it northwards into entirely new ground, and under immense cover, and yet at different times the lode has shown not only improvements by yielding ore of the value of 1 ton to the fathom, but indicated higher signs of being nearer to much greater deposits, yet up to this they have failed to come upon them. Still he looks upon the trial as a most important and vital one to the mine, and should never be given up until they reach a junction with a large slide known to be ahead of us, and which, in similar instances in Great Laxey Mine, is the cause almost unfailingly of a productive and valuable lode.

In reference to the future of the mine, he has no hesitation in again asserting his opinion that North Laxey will result in a good property, but a further depth must be attained; he is greatly confirmed and strengthened in this opinion by the late improved size and character of the lode in the shaft. He believes the new levels that will shortly be opened out from the bottom will develope a much larger and richer lode than they have yet had in the mine. At the same time he urges a further sinking of the shaft with the least possible delay; for this purpose particularly auxiliary steam-power in summer months is requisite, and he is glad the directors have taken the necessary steps to provide it at once. On Saturday 30 tons of lead ore were sampled.

The CHAIRMAN said that the report which they had just heard read really contained all the information the directors had to communicate, but he might congratulate them upon the fact that the mine was never in a better position than at the present moment. Their local director and manager were, however, present, and they would be glad to give the shareholders any details as to the machinery or underground operations if they would put any questions to them. He concluded by formally moving the reception and adoption of the report and accounts.

Mr. SPITTALL seconded the resolution.

A SHAREHOLDER enquired how much lead was now being raised, and how many shares remained to be issued? He thought they did not appear to be in quite so good a position as last year, as, notwithstanding the large addition to the capital account, they had a very small capital in hand, and in six months more money would require to be raised.

Capt. ROWE stated that the present output was from 12 to 15 tons of lead per month.—Mr. MURCHISON said that 17,000 shares were issued.

The CHAIRMAN said it was quite true that if they only raised 15 tons of lead per month their money would be expended in six months, but they had been doing a large amount of exploratory work, and they believed that as the levels were driven the produce would be larger.

Mr. SPITTALL (the resident director) could assure the meeting that the wages and other expenditure at the mine were all carefully attended to; every cost-sheet was examined and checked before it was sent to the London office. The payments were all made by Capt. Rowe, and there was also another thoroughly practical man at the mine who rendered very efficient services.

Capt. ROWE might add that, as a large shareholder, apart from his position as connected with the management of the mine, he would be sure to see that the utmost economy was practised. He had a large stake now, equal to many thousands, in the mine, so that it was to his own interest to work it to the best advantage, as it was nothing but the intrinsic value of the mine that could repay him.

The resolution for the reception and adoption of the report was then put to the meeting, and unanimoutly agreed to.

Mr. GRANVILLE SHARP said that the question had been raised as to the lode not being the same as the Great Laxey lode, and as Capt. Rowe was present he would like to have his views upon the matter.

Capt. ROWE was quite aware that the question had been raised not only now but formerly; he could, however, explain the matter in a very few words. The Great Laxey and the North Laxey setts adjoined each other, and the lode, which was solid and undivided up to a cross course, divided into two branches on the other side of the cross course to the north, and going towards the boundary. The North Laxey is on the western fork, and the East Snaefell, long since abandoned, on the eastern fork of the lode, and it was the opinion of himself and of many very competent miners that the western fork was the main fork of the Great Laxey lode, and the more experience they had the more this was confirmed.

Mr. G. SHARP enquired by whom the East Snaefell was formerly worked, as he had heard it stated that the main fork was in that property?—Capt. ROWE said it had been worked by Mr. Thompson.

Mr. G. SHARP was gratified to hear that as it fully accounted for the circulation of the report, inasmuch as it was by Mr. T. Thompson, jun., that the report had been circulated.

Capt. ROWE said that at the Great Laxey near the cross-course the two branches were 3 fms. apart, but at the point where the North Laxey shaft now was there was a quarter of mile between the two forks. He was underground on Friday, and there was so remarkable a change in the appearance of the lode that he had thought it worth while to bring a few stones to show to the shareholders. The ore is not rich, but the change is a very favourable one, as there was a total change of rock from the clay-slate in which they were; it is now a kind of gneiss, carrying strings of good lead ore, and it was generally believed that as soon as they get into this new rock the lode will improve.

Capt. MCGREGOR was down at the mine on Friday, and although he never went underground he was much gratified at the increased quantity of lead which was being brought to surface.

Messrs. G. Blogg and S. W. Daukes were re-elected, and Messrs. Brandt, Stansfield, and Co. were re-appointed auditors at 5*l.* 5*s.* remuneration, the proceedings terminating with the usual complimentary vote of thanks to the Chairman.

MANX SILVER-LEAD MINERAL COMPANY.

The first annual general meeting of shareholders was held at the Royal Hotel, Liverpool, on April 5,

Mr. R. A. WATSON (the Chairman of the company) presiding.

Amongst those present were Messrs. D. Campbell (vice-chairman), W. A. Holloway (managing director), E. O. Bleackley, J. S. Hall, Henry Ganderton, H. Dalton, J. Smyth, W. H. Bullock, J. Green, Capt. R. Smith, C. Wells, J. M. Cooper, George W. Hughes (secretary), W. A. Byrom, Crowe (captain of the mine), &c. The notice convening the meeting having been read, the secretary submitted the following report of Capt. J. Crowe:—

East Baldwin, April 1.—In laying before you the annual report for the general meeting to be held in Liverpool on Wednesday, the 5th inst., I beg leave to make the following statement of work done in this mine since the formation of your company, together with the past results and present prospects. Since Jan. 1, 1875, our operations have been confined principally to driving east on the new, or No. 3 lode, and south on the shaft, or No. 1 lode 70 fm. level. These have been our principal workings for developing the mine, together with cross cutting and stoping, and, of course, apart from the necessary work, such as repairing levels and sumps, doing pitwork, &c. The amount of ground cut since then is as follows:—Driven 53 fms. 3 ft.—underhand stopes, 2 fms.; cross-cut, 4 fms. 4 ft.; overhand stopes, 46½ fms. No. 1 lode, 70 fm. level, south of the shaft, is driven upwards of 30 fms. on the course of the lode from the junction of the east and west, or No. 2 lode, by six men, but has yielded nothing of value up to the present. However, I am glad to say our prospects here are brighter than on any former occasion, as the end has undergone a great change for the better within the last few days, being composed principally of quartz and spar, containing a nice mixture of lead, and letting out a greater outflow of water.—No. 1 Lode, 50 fm. level: We have driven north on the course of this lode from the bottom of the sumps about 3 fms. It is very strong and powerful at this point, and yielding a nice mixture of lead, blende, and copper, but in consequence of it running in the direction of the shaft it was abandoned, and the men engaged therein put back to the 70.—No. 1 lode, 35 Fm. Level: In driving this level south of the sump we have met with good results, having driven through several fathoms of good orey ground, on which we are now stoping, and which I have no doubt will continue to yield good orestuff up to the 25. The south end of this pitch has improved considerably since Mr. Ganderton's visit down the mine, the rib being from 8 to 12 in. wide, and will yield fully 2 tons of ore per fathom.—No. 1, 25 Fathom Level: When cleaning out the 10 some time ago we discovered a nice run of ore ground in the sole of that level, and on finding the same run in the roof of the 25 we at once engaged more men and set them to take it down. The pitch is above 5 fms. long, and yields very good saving work for lead and blende throughout, and looks very promising. We have made various improvements of late both underground and at surface. We have laid down a wagon road from the shaft to the south forebreast 70 fm. level, which saves a great amount of time and labour in getting the stuff to the shaft. We have also improved the pitwork and raised the pit top and bob-pit about 4 ft. higher. This will give us a much better and more convenient floor. We have also considerably enlarged the washing floors, on which Mr. Smalley, of Liverpool, and his men are busily engaged erecting crushing machinery, there being at the present time fully 150 tons of stuff ready for crushing, and which, I am pleased to say, is daily increasing. The machinery and pitwork are in good order, and working first-rate.—JOHN CROWE.

The CHAIRMAN, in moving the adoption of the report and statement of accounts, said—Gentlemen, I cannot help remarking that the report of Capt. Crowe of the working of the mine for this, the first, year of the company shows marked progress, and gives me, and I am sure will give all our shareholders, very great satisfaction indeed. The last clause especially is very assuring. If we have 150 tons of orestuff on the bank ready for crushing it is certainly a most undeniable indication that we are getting near the goal of our ambition, and a tolerable assurance that we are nearing the greater body of lead for which we are looking, and which is to give us some handsome dividends. From month to month, as Capt. Crowe has handed your directors his reports, a more encouraging tone has prevailed, and just prior to this meeting, in a conversation I had with him, he assured me that there are exactly the same indications in our mine at present as other mines which have proved so well have displayed just before they struck their wealthy lodes. This, I am convinced, is no random assertion. Capt. Crowe worked for a great number of years in the Laxey and other mines, so that he does not speak from hearsay evidence, but from the inexorable logic of facts—personal experience and observation; more, your directors have verified all that Capt. Crowe has said in his reports by individual descent and inspection of the mine and its levels. A fortnight ago a committee visited the mine, and spent a very great deal of time in thoroughly scrutinising the work for the past year. Mr. Ganderton, a director, who was there for some days, also went through the whole of the workings, and will, no doubt, be able to give you some valuable information Personally my interest in and zeal for the mine is increasing, and every week convinces me that our venture will, ere long, be a patent success. We have purchased crushing machinery, and the engineer we have selected is now busy affixing it to the water wheel, so that we may commence crushing at once. The secretary will inform you when this parcel has been sent into the market, which will be very shortly. We have been very successful with our sale of shares, and in getting a proprietary of the most desirable nature, and I would here say, on the part of my co directors as well as myself, that our thanks are due to them. While I am speaking I am reminded by our managing director, Mr. Holloway, that he has in his pocket applications from the island for a quantity of shares. I am more than ordinarily gratified to receive applications from the residents in the island, because being on the spot they have facilities for ascertaining whether the mine is really doing all it professes to do, and you know our Manx friends are rather shrewd customers to deal with. I have found in my experience that they are not particularly addicted to throwing money away, and therefore, as an ordinary shareholder, I should say that if I see residents on the spot investing, there must be something worth investing in. We want to have as many islanders on the list as possible, so that we may present a goodly phalanx against the enemy. These applications from the Manx people show confidence in the mine, and prove that they, being in a position to test all that is said, are perfectly satisfied with the *bona fides* of the property. Regarding the expenses of the year, your directors consider that they have acted judiciously and economically (and it is something to do both). We did not turn 50 men into the mine before we had work for them to do. We commenced in a day of small things, and have gradually added more to the staff as the mine has developed, and the wages-sheet for the last month is the largest that we have had—a sure sign that we are progressing one way or another. Of one thing I am confident, and that is, that we are not performing that paradoxical feat of progressing backwards. Gentlemen, I beg to move the adoption of the report and balance-sheet as read.

Mr. D. CAMPBELL, in seconding the motion said: Gentlemen, at present we have about 20 men employed driving, raising the ore to bank, and getting it ready for market. Mr. Ganderton informs me that after I left the island he saw the crushing machinery partially fixed, and that it will not be long before we hear the good tidings of ore going into the market. This is what we want, and I am guarded

when I say that next year I expect we shall have the pleasure of declaring to you a dividend. I have very great pleasure in seconding the adoption of the report and balance-sheet.——On being put to the meeting the motion was carried unanimously.

Mr. COOPER afterwards asked for an explanation respecting the small amount charged in the account for wages for the past 12 months.——The SECRETARY explained that a balance sheet was issued four months after the incorporation of the company, and if the amount paid in that period was added to the amount in the balance-sheet (which was only for eight months) it will not then seem so inadequate.

Messrs. Watson, Bleackley, and Hall were the retiring directors, and the Chairman left the chair, when Mr. Ganderton was voted to his place.

Mr. GANDERTON then proposed, and Mr. CHARLES WELLS seconded, the re-election of Mr. R. A. Watson as a director, which was carried unanimously.——Mr. CAMPBELL proposed, and Mr. J. M. COOPER seconded, the re-election of Mr. E. O. Bleackley, which was carried unanimously.——Mr. GANDERTON proposed, and Mr. CAMPBELL seconded, that Mr. J. S. Hall be also re elected, which was carried unanimously.

Mr. WATSON having resumed the chair, called upon Mr. Holloway, the managing director, to report to the meeting his views of the mine.

Mr. W. HOLLOWAY said: It gives me great pleasure to add my testimony to that of those who have already spoken as to the prosperity and the future prospects of the mine. In reference to the remarks made by our friend, Mr. Cooper, we considered it more prudent in starting to put on only a few men, and increase the staff by degrees, as we have done: in selecting our men we have done our best to get those in whom we could place confidence, and with whom we could work amicably and harmoniously. I think that now we have a class of miners thoroughly efficient, and which will be augmented from time to time as necessity arises. I am sure Mr. Cooper cannot demur to this. In reference to the ore crushing machinery, I expect that by this time it will be nearly ready for crushing operations. To show you that things are now looking up in the island, I will lay upon the table some applications which I have brought with me from there which have been handed to me within the last 10 days. (Applause.) In addition to these, several shareholders have recently doubled their interests, and several more have intimated their intention of doing so. Regarding the results achieved at the mine, Captain Crowe's report and your Chairman have so fully informed you of these that I can add nothing more, beyond saying that in the 70 we have got a good flow of water.

A SHAREHOLDER: Is that a good indication?——Mr. HOLLOWAY: Yes, Sir; an excellent one, and I am hoping for great things there. It is evident we are approaching similar ore ground to that found in the upper levels. In conclusion, I shall always pay the greatest attention to the interests delegated to me by the shareholders and my brother directors, which I am enabled to do all the more efficiently being resident in the island.——After votes of thanks had been passed, to the managing director and Chairman the meeting concluded.

WHEAL OWLES.—At a meeting of adventurers held at the mine, on April 7, the accounts showed a debit balance of 18,57*l*. 7*s*. 10*d*. Work performed during the 16 weeks—145 fms. 3 ft. driven in levels, and 45 fms. 3 ft. 10 in. sunk in shafts and winzes: 28 pares stoping for tin on tutwork, and 20 pitches working on tribute. Mr. Richard Boyns, the purser, writes—"I am glad to say that for the account passed to-day we have raised about 90 tons of tin, which will nearly meet cost, notwithstanding we have made an outlay of more than 300*l*. in new work at Wheal Edward and Cargodna. I hope Cargodna will be forked to the depth of West Wheal Owles in about a week. Having but one shaft at West Wheal Owles, and our workings extended 80 fms. beyond high-water mark, the ventilation is by no means good, but when a communication with Cargodna is effected it is sure to be excellent. Since last account we have driven a cross cut south at the 45, West Wheal Owles, 11 fms., and cut Cargodna two or three days ago. The lode is 3 ft. wide, and, although it is early to speak of its value, we think it will work at a good profit. At the 35 this lode was cut in killas, but at the 45 we have struck it in granite, so that we are in the immediate vicinity of the junction. We expect to keep up our returns for the next 16 weeks."

WHEAL AGAR.—At the meeting of the shareholders, held on Thursday (Mr. John Weston in the chair), the accounts showed a balance due to the bankers and others of 96*l*. 12*s*. 9*d*., a call of 10*s*. per share was made.—Capt. W. Teague, jun., was present, and gave a very satisfactory report on the present and future prospects of the mine. Every effort is being made to get the shaft down to the 195, and it is hoped to accomplish it before the next meeting. The stamps will soon be ready to go to work, and it is believed that by the next meeting the mine will be in a position to make fair returns of tin and copper ores. There is a fine lode in the shaft, from which some splendid stones have been sent to the office.

FOREIGN MINING AND METALLURGY.

It appears from official Belgian returns that in the first two months of this year Belgium imported 115,500 tons of minerals and limailles, as compared with 111,300 tons in the corresponding period of 1875, and 77,900 tons in the corresponding period of 1874. The Grand Duchy of Luxembourg alone furnished Belgium this year with 101,900 tons of minerals and limailles. The quantity of rough pig and old iron imported into Belgium in the first two months of this year was 30,400 tons, against 19,900 tons in the corresponding period of 1875, and 15,000 tons in the corresponding period of 1874, showing an augmentation of 100 per cent. during the last two years. As with minerals, so with pig, a very large portion of the supply (or 17,000 tons) came from the Grand Duchy of Luxembourg. Of other articles, such as wire, rails, plates, chain iron, &c., the imports into Belgium in the first two months of this year were 1600 tons, against 2100 tons in the corresponding period of 1875, and 8000 tons in the corresponding period of 1874. The exports of minerals and limailles from Belgium in the first two months of this year amounted to 21,700 tons, against 24,000 tons in the corresponding period of 1875, and 9000 tons in the corresponding period of 1874. The exports of rough pig and old iron from Belgium amounted in the first two months of this year to 2300 tons, against 2000 tons and 3600 tons in the corresponding periods of 1875 and 1874 respectively. The exports of iron rails from Belgium to Feb. 29 this year amounted to only 3600 tons, against 10,000 tons in the corresponding period of 1875, and 4000 tons in the corresponding period of 1874. The exports of wire, plates, &c., from Belgium have increased this year; the best clients of Belgium for these products have been the Low Countries, France, Switzerland, and Russia—countries in which Belgian iron is a good deal appreciated. The exports of steel rails and steel wire and sheets from Belgium have slightly increased this year; they only amounted, however, to Feb. 29 to 231 tons. The use of iron rails has also been by no means altogether abandoned in Europe; thus the Thy-le-Château Works have recently contracted to deliver 4000 tons of iron rails to Holland, 3000 tons of iron rails to Switzerland, and 3000 tons of iron rails to the South Italian Railway Company. The more cheerful tone which has prevailed at Middlesborough has had a good effect also upon the Belgian iron markets. A contract is about to be let at Bromberg for 5500 tons of iron rails.

The French coal trade has remained extremely quiet, and nothing has occurred to impart any activity to it. On all sides large consumers—that is ordinarily large consumers—show a disinclination to conclude heavy contracts. Prices are under these circumstances somewhat fluctuating and nominal. It is very natural that coal consumers should under present conditions exhibit a disposition to lay in only such supplies as will carry them on from day to day, but such a course is embarrassing to the managers of coal mines, who find it difficult to regulate and adjust their extraction according to the requirements of consumption. There is no anticipation of any improvement in quotations, and there are scarcely any apprehensions of transport difficulties, since both the iron and the sugar trades are only purchasing sparingly at present.

The stagnation noticeable in the Belgian coal trade appears to be complete. Stocks are beginning to be formed at the various pits, but hopes are entertained that a more decided improvement which is anticipated in the Belgian iron trade will give a stimulus to affairs. Foreign coal is competing rather sharply with Belgian coal upon the Belgian markets; thus in January and February this year 122,000 tons of coal were imported into Belgium, the corresponding imports in the corresponding period of 1875 having been 105,000 tons, and in the corresponding period of 1874, 61,000 tons. Of the coal imported into Belgium in the first two months of this year rather more than half (or about 66,000 tons) came from England. On the other hand, the exports of coal from Belgium have considerably increased this year, having risen to Feb. 29 to 603,000 tons, as compared with 561,000 tons in the corresponding period of 1875, and 421,000 tons in the corresponding period of 1874. In these totals the exports to France figured for 531,000 tons, 538,000 tons, and 399,000 tons respectively. It will be seen that the general movement of coal to and from Belgium has very sensibly increased of late. Advices from the Bochum district (Germany) state that coal is falling in price, and that the production is being reduced. In spite, however, of the curtailment of the production stocks are increasing, and the approach of the summer and the threatened closing of sundry ironworks are naturally regarded as discouraging circumstances.

A revival is still spoken of in the French iron trade, but it is difficult to perceive that it has actually occurred. The aspect of affairs is, perhaps, a little less unfavourable than it formerly was, but it would be a delusion to suppose that the time of trial is altogether at an end. If much reliance is placed upon the support of the railway interest to revive the at present depressed iron trade of France this hope may, after all, be disappointed, since steel rails are now competing very sharply with iron rails. In connection with recent orders given out by the great French railway companies, it may be observed that the rate paid for cast-steel rails has been 9*l*. 16*s*. per ton, while 8*l*. 16*s*. to 10*l*. per ton was paid for iron rails. It follows that steel rails have become almost as cheap in France as iron rails.

Mr. Pontey, geologist of the Union Pacific Railroad, describes two soda lakes in Wyoming territory, the larger one of which covers about 200 acres. The other covers about 3½ acres, and during the greater part of the year it is a concrete mass of carbonate of soda crystals. The soda is nearly all carbonate, and in quality is said to be equal to the imported article. It is estimated that the larger lake would yield on evaporation over four and a half million dollars worth of soda, and the smaller lake, already crystallised, is supposed to contain another million dollars worth of soda.

TECHNICAL EDUCATION IN CANADA.

The vastly increased energy displayed, and the large amount of useful work done during the past few years by the Board of Governors and Alumni of the University of King's College, Nova Scotia, with a view to provide the utmost facilities for sound collegiate and technical education to the young people not only of Nova Scotia but of the entire Dominion, have at least had the good effect of awakening other educational bodies to action, although it may be action of an undesirable character. Adopting the Darwinian hypothesis of the "survival of the fittest," those connected with King's may well be congratulated upon the probable result of the interest which has been created, all that now seems desirable being that the lay element of the Province and of the Dominion should have the experience of older countries in educational matters fairly laid before them. The first and most important fact which they have to learn is that the graduates of "paper universities," by which title they designate establishments on the model of the London University, to which it will be recollected Lord Brougham gave the more mechanical title of a "graduating machine," form a totally different class of men from those who have received a true collegiate education, the reason being very easily given. In all paper universities—under which designation must be included not only London and certain colonial universities, but Paris also—the system of teaching in the affiliated colleges is at once compulsorily uniform, yet objectionably dissimilar, because both teachers and students work not to teach or to become acquainted with the subject under consideration to the best of their ability, but in order that certain theoretical questions may be answered in such a way that the student's ignorance shall escape detection.

Great as is the evil attending the paper university system for ascertaining the relative merits of students, it is difficult to make that evil apparent to the non-practical teacher; but it will, perhaps, be understood from a statement of results. At Paris a good memory and a careful reading of the "Manuel du Baccalaureat" will ensure a fair pass, and at London passing or plucking is no criterion of the candidate's ability. It will, of course, be understood that reference is not here made to medical students, who have, perhaps, greater facilities for study in London than in any other part of the kingdom. A candidate within the writer's knowledge succeeded in passing in chemistry although he had never seen a chemical experiment performed, and although less than 24 hours before he sat down at the examination table he gave the following sapient replies:—He was asked by the writer what system of analysis he considered the best? He replied the Giessen system, with the utmost confidence imaginable. The interrogator, surprised at the readiness of the reply, made the further enquiry—Supposing an acid solution be given you and you add hydrochloric acid thereto, what metallic precipitate, assuming a metal to be present, will be thrown down? He answered, no doubt truthfully, that it would depend upon what the solution contained. His replies to other questions upon various subjects in which he was about to be examined were equally intelligent; yet he passed, and is now a graduate, his academical success being due, not to his intelligence or perseverance, but to the fact of his having been coached by men who knew the exact calibre of the examiners, and what questions they were likely to ask.

This miscarriage of justice to students is not confined to paper universities, but extends to every institution where examination is made the sole test of competency. There are coaches who advertise that they will prepare students to pass the London Pharmaceutical Society's examination in three months, and who, moreover, are so confident of outwitting the examiners that they sometimes offer to make their payment contingent upon the pass. The fact is that wherever the pass is dependent upon examination alone the teaching must run in a particular groove, and the tutors or professors are prevented from employing the system of teaching which, being in accordance with their particular mental constitution, will best enable them to impart their knowledge to their pupils, and are compelled to substitute an artificial system distasteful to themselves, and but ill-adapted to the honest student. The evil of the system has become so evident from the 80 years' experience in France, where it should be mentioned it has resulted in university degrees degenerating until the diploma of a technical school is regarded as far more honourable, that it is now being changed, so that probably ere long the old collegiate system will be revived; yet the Nova Scotians and Canadians are deliberately seeking to create the evil they are now free from.

The distribution of 2500*l*. per annum amongst six colleges established for providing education facilities to Churchmen, Catholics, Presbyterians, and various other classes of dissenters is certainly not likely to lay the Legislature open to the charge of extravagance, and it would unquestionably be preferable to vote ten times that amount to maintain the several colleges independent than to establish a paper university at one-half the cost, or at even 500*l*. per annum. The degrees of a Nova Scotian paper university would enjoy no greater recognition in the republic of letters than the prizes of a village dame school, and there is the less necessity for a paper university in Canada since those who prefer the degrees of such a corporation can secure the London degree by the simple and economic process of arranging with London University to increase the number of examination centres in the Dominion. To suppose that a Nova Scotian paper university would bear the slightest comparison with London University would be to assume that the Nova Scotians are egotistic beyond comprehension, while from the sparseness of the population, and the very few facilities outside the colleges for the acquisition of knowledge, it may safely be concluded that every step which tends to weaken the colleges will be one step toward plunging the province deeper into ignorance and inanition. The several colleges have now an opportunity of showing during the coming five years what benefits they can confer on the community, and it may be hoped that these will be so apparent that a paper university will no more be thought of.

THE GOLD YIELD OF NOVA SCOTIA.

Although the indefatigable labours of Mr. Alex. Heatherington, F.G.S., have not yet resulted in securing an adequate amount of British capital for the development of the gold resources of Nova Scotia, there can be no question as to the useful services he has rendered to the province by demonstrating the capabilities of the gold deposits to afford remunerative returns provided only a fair amount of capital and energy be applied in opening them out. Mr. Heatherington has now issued the eleventh annual edition of his statistics,* bringing the figures down to the end of the past year, from which it would appear that the worst period of Nova Scotian gold mining has passed, and a period of gradual improvement set in, although some time must necessarily elapse before the activity of 1865 and two following years is restored. The author points out that the object of the statistics is to show the supporters of mining industry that Nova Scotia really is a gold region of some capacity, where judiciously applied capital would obtain profitable returns.

Apart from the financial depression now prevailing throughout the Dominion, Canada has never been in a position to foster speculative enterprise, as the more familiar pursuits of farming, lumbering, shipbuilding, and fishing absorb all there is to spare of accumulated wealth. In ordinary commercial transactions here 12 per cent. per annum is no uncommon rate for accommodation, while for mining operations 2½ to 5 per cent. a month was often charged with money plentiful, and now it could not be obtained for the latter purpose on any terms. It is natural, therefore, that one should look to the English market where capital is abundant, and generally ready to assist legitimate venture. The unembellished tabular statement of 15 years' results is preceded by the customary Annual Review, and a republication of the opinion of disinterested authorities concerning this subject, in the belief that frequent announcement sustained by facts will eventually gain for it the desired recognition.

TOTAL YIELD.—The discovery which led to a general search for gold, and founded the Gold Mining Industry, was made by John Gerrish Pulsiver, a farmer while exploring proclivities, in May, 1860, at Mooseland, Old Tangier. Actual mining was not commenced until so late in the year that its statistical history may be considered as beginning with 1861, from which period to the close of 1875 a yield valued at 992,291*l*. has been obtained, without making allowance for quantities not reported, amounting, perhaps, to 10 per cent. of the whole. Of this gross yield 973,599*l*. was derived from vein-stuff, 12,531½*l*. from alluvial washings, and 5890*l*. from crushed cement. The largest declared aggregate yield in one year was 109,258*l*. for 1867; the largest annual yield of any separate district 57,617*l*. for Waverley in 1865; the largest annual yield of any single mine (not including a large amount known to have been stolen) 34,910*l*., from the Tudor, at Waverley, in 1865; and the largest bar of gold ever cast was 1200 ozs.—4800*l*.—in June of the same year, from the same mine, then the property of Mr. Leopold Buerkner. The largest return in proportion to the workings is 100,000*l*., from the Wellington Mine, the greater part of which was obtained from a 13-inch vein, opened 180 feet in length to 570 feet in depth. The largest district yield is 296,000*l*. obtained at Sherbrooke, mostly within an area of 40 acres.

ALLUVIAL MINES.—With the exception of beach washings at the ovens, which were prosecuted during the years 1861-2, alluvial mining has been almost wholly neglected. Prof. B. Silliman and Mr. Campbell incline to the opinion that the auriferous debris of this province have been swept beneath the ocean; but MM. J. W. Dawson, J. A. Philipps, T. Sterry Hunt, the late Auguste Michel, and A. R. C. Selwyn, who, in the succession named, have examined and reported on this region, consider that systematic search for alluvial gold might well repay the prospector.

AVERAGE PER TON.—The 14 years' mean—there are no data for 1861—from the crushing of 315,025 colonial tons is equal to 17 dwts. 0·66 grs. per avoirdupois ton. The highest district average for the whole period is 2 ozs. 14 dwts. 2 grs. for Montagu from the crushing of 5844 tons (of 2240 lbs.) of quartz; the lowest 8 dwts. 22 grs. from 2984 tons crushed in the unclassified districts. As concentration is not practised in any one mill, the above averages imperfectly represent the full gold contents of the quartz crushed. The average for Victoria for 1874 was 11 dwts. 20·51 grs.

AVERAGE EARNINGS PER MAN.—The mean yearly average for all districts amounts to 12*l*. 7*s*. The highest yearly average for the province is 15*l*. 5*s*. for 1873; the lowest 3*l*. 4*s*. for 1862. (The average for Victoria, Australia, in 1874 was 90*l*. 8*s*. 3·07*d*.) The highest district average for the whole period is 17*l*. 0*s*. 6*d*. for Sherbrooke.

NUMBER OF MINERS.—The total number of days' labour declared for 14 years is 2,489,470, equal to the number expended in 59 days in Victoria in the third quarter of 1875. The greatest number of miners employed in any one year by the whole province was 887 in 1863, and by one district 317—in Waverley—in 1866. The daily provincial mean for the whole period is 570.

QUARTZ CRUSHED.—The total quantity crushed amounts in round numbers to 281,275 tons British, or no more than has been treated in five years in one mine of comparatively small extent in Australia.

MILLS.—At the close of the year 1875 there were 24 miles standing, but not half in constant operation. They average nearly 10 stamps apiece, and their aggregate capacity is about 250 tons per 24 hours; or, if the quartz were previously comminuted in a Blake's crusher, 100,000 to 120,000 tons a year.

MINT VALUE.—From 38 assays of ingots, weighing in the aggregate 3508 ozs., by the New York Mint (obligingly reported by the Bank of Montreal and Messrs. W. L. Lowell and Co., bankers and bullion dealers,) and two analyses made and cited by Prof. O. C. Marsh, the mean fineness of Nova Scotia gold would appear to be 943·3, worth 4*l*. 0*s*. 6½*d*. per ounce, and the average for each district as follows:—Sherbrooke, 947·5; Waverley, 945·6; Renfrew, 942·7; Wine Harbor, 961·6; Montagu, 959·2; Oldham, 960·2; Tangier, 952·8, 981·3; Stormont, 921·5, 944·0; Uniack, 930·2; Ovens, 920·4; Fifteen Mile Stream, 944·5; Lawrencetown, 944·0; Gays River, 970·6; Caribou, 944·7.

MINERALOGY OF NOVA SCOTIA—CENTRALLASSITE.—An interesting paper upon certain triassic trap minerals has been contributed to the "Philosophical Magazine," by Prof. H. How, D.C.L., of King's College, Windsor, Nova Scotia. In 1859 he described three minerals which he found near Black Rock, in the Bay of Fundy, and considered new, naming them cyanolite, cerinite, and centrallassite. Dana considered cyanolite and centrallassite to be identical, and Burghardt said that cyanolite was simply akenite. Now, both these authorities may be correct, but if this be admitted the system of mineralogical nomenclature must be acknowledged to be simply absurd. That mineralogists are an exceedingly useless class of scientists is beyond question, a few hours chemical examination usually sufficing to explode their peculiar notions. The four minerals—gyrolite, okenite, centrallassite, and cyanolite, are each composed of lime, silica, and water, the proportions being respectively 12, 3, 18; 12, 16, 24; 12, 15, 15; and 12, 30, 15: yet the mineralogists, by the application of their so called science, cannot distinguish these compounds from each other, nor can they agree among themselves what constitutes identity and what dissimilarity. A chemist who failed to distinguish a tetroxide from a protoxide would be properly branded as an ignoramus, yet mineralogists occupying the highest reputation cannot determine whether compounds containing 4 parts lime and 1 part silica, and 4 parts lime and 10 parts silica are identical. The sooner mineralogy is ignored the better will it be for true science, but so long as the present system of nomenclature is retained there can be no doubt that Prof. How is entitled to the credit of discovering both cyanolite and centrallassite, and there seems much to justify his opinion that from the correspondence of okenite, gyrolite, and centrallassite in their constituents, and their approximate quantitative composition, together with the occurrence of a few prismatic needles in tufts along the pearly plates, or in close proximity noticed formerly by himself in the case of the latter mineral they are closely related, but the merging of one in either of the others is not admissible.

JOURNAL OF THE IRON AND STEEL INSTITUTE.—The second portion of the 1875 volume of the Transactions of this Institute has just been issued through Messrs. Spon, of Charing Cross, and contains a very full report of the Manchester meeting, with an elaborate series of engravings in illustration of them. The report on the Progress of the Iron and Steel Industries in Foreign Countries contains much valuable and interesting information, including notices of Mr. Ramour's paper on the Mokta-Hadid Iron Deposit and its Working, the Condition of the Belgian Iron Trade, a large number of statistical details with reference to the Iron Trade of France, an excellent Abstract of the Official Statistics of the Mining and Metallurgical Industries of Germany, an outline of the Russian Iron and Steel Trades, and an Abstract of Mr. Swank's Statistics of the United States Iron and Steel Trades, prepared for the American Iron and Steel Association. In the second division, devoted to Metallurgical Technology, there are interesting notices of Messrs. Ibbe and Durassier's paper on the Physical Properties of Steel, Raschette's Roasting Kiln, and Mr. Charles Plagge's paper on the Substitution of Liquid, Vaporised, and Gaseous Hydrocarbons for Solid Fuels in Blast Furnaces. Mr. Forbes has evidently bestowed a large amount of time and trouble on the preparation of the report. The report on the Iron and Steel Industries of the United Kingdom is of the usual character.

QUARTERLY JOURNAL OF SCIENCE.—The original articles in this magazine on Conscience in Animals, Nature's Scavengers, the Newly-discovered Force, the Biological Controversy and its Laws, and the Mechanical Action of Light, are soundly written, and worth careful perusal. The Notices of Scientific Works are, as usual, interesting and impartial, and the record of Progress in Science will afford a fair insight into what has been doing during the quarter.

FINANCIAL REGISTER.—The fourth annual edition—that for 1876—of the Financial Register and Stock Exchange Manual has just been issued by Messrs. C. and E. Layton, of Fleet-street, and contains a vast amount of information of great utility to those having dealings with public companies. There are summary tables showing the public debts of the principal States, and amount of debt per head of population; the principal joint stock banks of the United Kingdom, their capital, shares, and stock; and the principal insurance companies of the United Kingdom, their premium, income, and number of policies. With regard to each undertaking the location of the head office is given, the amount of capital subscribed and paid up respectively. The dividends paid in each of the last four year, and in most cases the highest and lowest price of shares during 1875. The names of the directors, managers, and secretaries of the several companies are also given. The volume contains all the particulars the man of business is likely to require, and as these are given in readily accessible form it is entitled to a place in every City counting house.

INDICATING THE ILLUMINATING POWER OF GAS.—The invention of Mr. W. T. SUGG, of Westminter, is based upon the fact that to maintain a flame of a certain height a quantity of gas proportionate to its quality will be consumed in a given time, and consists of a meter to which gas is admitted, and the drum made to revolve, the gas passing from it through two governors fixed to the meter. The first governor regulates the pressure, and the second corrects any irregularities the first one may have failed to meet. The gas from the governors flows to an argand burner by way of a standard fixed to the top of the meter, and fitted with a cock, handle, and pointer, and quadrant or divided arc. The standard has also attached to it a frame carrying a horizontal wire and coloured glass plate, to and by which the flame from the burner is adjusted. The pipe connecting the supply pipe, meter, and governors together has inserted in it at a suitable point a bye-pass or three-way cock, so that the gas may pass directly to the governors, and thence to the burner, or it may proceed first through the meter before reaching the governors. To test the illuminating power the gas is first admitted from the supply pipe through the governors to the burner where the gas is lighted, and the flame adjusted to the height of 3 in. The bye pass is then turned so as to permit the gas to flow through the meter, when by observations of one minute the quantity of gas consumed and the illuminating power in parliamentary sperm candles will be indicated by the pointer on the dial, which is suitably marked for that purpose.

COMPOUND ENGINES.—Engines constructed according to the invention of Mr. H. TURNER, of Birkenhead, consist of a low-pressure cylinder of ordinary type. Over the low-pressure cylinder, and on the top or end thereof, there is placed a high-pressure cylinder, the centre line of which comes over and through a point somewhere between the centre of the low pressure cylinder and the packing ring of the piston of such cylinder. These cylinders, being the high-pressure cylinder and the low-pressure cylinder, are supported by a suitable framework, part of which may be the condenser or otherwise. The framework stands upon or joins on to a bed-plate, frame, or entablature, which forms the bearings for and carries the engine crank shaft. This crank shaft is so arranged that one crank pin is on a centre line corresponding with the centre line of the low pressure cylinder, and the other crank pin is on a centre line corresponding with the centre line of the high-pressure cylinder, both centre lines coming within the half diameter of the low-pressure cylinder. The double crank consists of three webs—a central web connecting the two crank pins, which are at right or other suitable angle to each other, and a web on the outside of each crank pin respectively. The journals of the crank shaft are formed on each side of the outside webs of each crank pin respectively, and are carried by corresponding bearings formed in the bed-plate, frame, or entablature.

* "The Gold Yield of Nova Scotia. Annual Statistical Exhibit." By ALEXANDER HEATHERINGTON, F.G.S., Halifax, N.S.: Canadian Mines Bureau.

A NEW FUEL—COAL DUST COMPRESSED AND BURNED.

In October, 1875, we published a full account of a new process invented by E. F. Loiseau of Mauch Chunk, Penn., for manufacturing fuel from the waste of anthracite coal. The process on a small scale was shown at the American Institute Fair of that year. A great many practical difficulties had to be overcome before it could be put in operation on a large scale, but they have all been surmounted at last, and a large factory for making the new fuel goes into operation here this week. The matter has been kept very quiet of late. All the stock in the manufacturing company is owned by a few wealthy coal and iron operators in Philadelphia and New York, and although the process is said to be amply protected by patent, the company, for some reasons of their own, have kept their operations as much a secret as possible. The dust of bituminous and semi-bituminous coal has long been converted into fuel in Europe, by the addition of pitch or coal-tar, and used in the form of bricks in locomotives and stationary engines, but the offensive odour emitted in burning has made it impossible to use the fuel for domestic purposes. Besides it is too expensive for general use, except where coal is very dear. What Mr. Loiseau discovered was a method of making a fuel from anthracite dust that would burn without odour in grates and stoves, and would bear handling and exposure to the weather without crumbling. This discovery would have been of little value without the invention of machinery that made it possible to manufacture the artificial fuel at a less cost than that of coal. To contrive such machinery and get it in perfect running order has occupied the inventor for many years.

The new fuel is composed of 95 per cent. of coal-dust and 5 per cent. of clay, with a small amount of a glue-like mixture made of rye flour and slaked lime. It is in pieces of the shape and size of hens' eggs. To make the pieces impervious to water, they are dipped in a solution of "candle-gum," a residuum of paraffin, and crude benzine. All the manufacturing processes are novel and ingenious. The clay is dried in an oven on sheet-iron plates, the fire being in an iron car running on a track so that it can be pushed forward or back ward under the plates. Then the clay is hoisted up to an upper story pulverised in a mill, and deposited in a wooden receptacle. Close at hand is an iron boiler 8 ft. diameter and 8 ft. high, in which the paste is cooked by steam and stirred by revolving paddles. The paste is of the consistency of thick cream, and escapes by a pipe at the bottom of the churn. The coal-dust is drawn up on an inclined plane in small cars and thrown upon an oscillating wire screen, which takes out all pieces of slate or small chunks of coal. As the dust falls through it is carried in an endless chain bucket elevator to a bin holding 5 tons. Now, the dust and the clay fall down into a curious little machine, that measures out just the proper proportions of each, and throws both ingredients of the future fuel into a common receptacle. But while they are dropping into this receptacle they receive a sprinkling of the liquid paste from perforations in an iron pipe. Another chain elevator takes the commingled ingredients up and deposits them in a hugh iron churn holding 6 tons, in which are seven revolving shafts, that swing their great toothed arms about in opposite directions and thoroughly mix the black grist. The substance is now of the consistency of moist sand. It falls upon a leather band, and is carried to the hopper of the pressing machine. This consists of two iron cylinders 30 in. diameter, and the necessary apparatus to revolve them. The cylinders are each indented with 870 large moulds and 56 small ones, and as the moulds on the two come together they press the soft mixture into shape, and afterward drop the egg-like chunks upon a moving wire-cloth belt below. The larger pieces weigh 2¼ ozs. each and the smaller ones ½ oz. Thus far the operation has been wholly automatic, and so it continues to the end. The egg coals, as they might well be called, must now be dried. They are dropped upon another wire belt they carries them to a great oven heated to a temperature of 250°, and fall successively on still other belts travelling in opposite directions until they have gone the length of the oven five times. When they come out they are ready for burning, but must be waterproofed to protect them from dissolution if caught in a rain-storm. For this purpose another travelling wire belt, across which there are upright partitions of wire, catches them, and gives them a bath of two seconds in an iron tank containing a solution of candle-gum and benzine. The tank is enclosed to prevent the escape of the fumes. From the tank the coals go to a big bin called the evaporator, which holds 15 tons. The benzine fumes rise through pipes to a condensing coil, and the recovered liquid is conducted back into the tank from which it ran into the bath. After remaining about an hour in the evaporator the coals fall upon another moving belt, which deposits them in the final receptacle—the "pocket"—from whence they roll into the coal carts.

From the time the clay went into the mill and the coal-dust was emptied on the separating screen the material has travelled a distance of 745 ft. without being once handled. In the succession of ingenious automatic processes lies the secret of cheap manufacture. The factory will produce 150 tons a day with one set of machinery, and the product will be sold for $1 a ton less than the price of stove coal. Contracts have been made for all the coal-dust at the Richmond wharves—the shipping point of the Philadelphia and Reading Railroad, and for an additional supply from the Lehigh region. In the mining districts the dust accumulates in huge piles around the "breakers," and has no commercial value. The new process of making fuel utilises a waste product and develops a new industry that promises to be of great importance. The new fuel will be shown at the Centennial Exhibition in a large iron pavilion to be erected near Machinery Hall. Cooking stoves, parlour stoves, and open grates will be placed in the pavilion to show the combustible properties of the fuel. It is said that 1 ton of it gives 25 per cent. more heat than 1 ton of stove coal.—*New York Tribune* (March 24).

SMITHS' HEARTHS.—The invention of Mr. JOHN REYNOLDS, of Birmingham, refers to such tuyeres as do not require water to keep them cool, and consists principally in controlling and shutting off the blast, breaking up the clinkers on the hearth about the delivery pipe, and preventing ashes or breezes from falling into and choking the delivery pipe when the blast is shut off. The opening and closing of the passage through which the blast passes to the blast-box is effected by a valve or sliding plate worked by a vertical lever situated in the blast box and in a lateral chamber of the blast-box. A vertical plug is jointed to the inner end of the lever, and works in the delivery pipe of the tuyere, which delivery pipe is formed in a block surmounting the blast box. When the lever is depressed the valve is opened, and by the descent of the plug the delivery-pipe is opened. The reverse motion of the lever shuts off the blast and closes the delivery-pipe by the lifting of the plug, the said plug preventing ashes or breezes passing from the hearth into the delivery-pipe. By lifting the lever to the required height, the plug is projected through the delivery-pipe, and clears away any clinkers which may have accumulated about the mouth of the blast delivery-pipe.

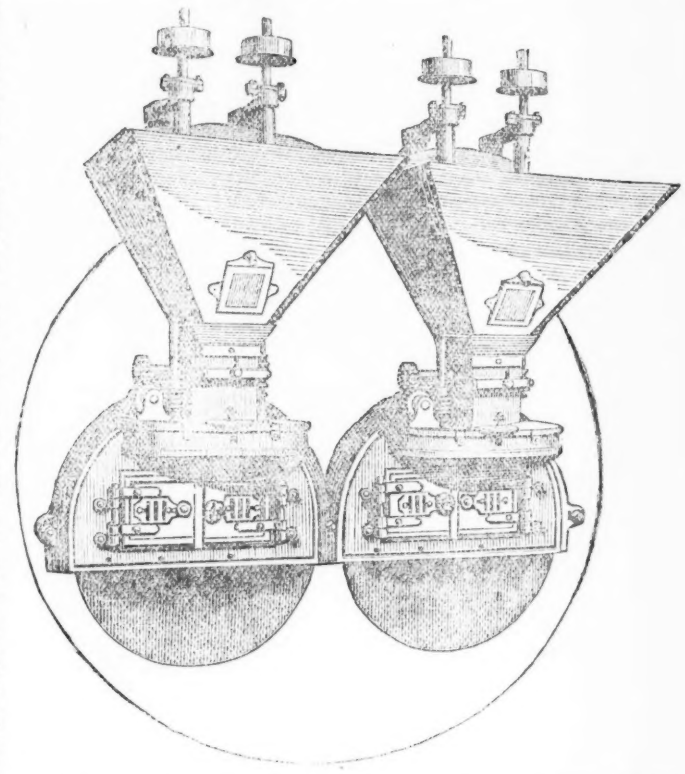
UTILISING WASTE FROM GALVANISING IRON.—Mr. E. W. T. JONES, of Wolverhampton, prepares from the skimmings of the zinc pots which are used in galvanising iron an oxide of zinc containing a large percentage of pure zinc oxide, by mixing the said skimmings with carbonate, oxide, or hydrate of calcium, or of other alkaline earths, or of the fixed alkalies, and heating the mixture in a retort or other suitable vessel sufficiently to cause a decomposition, resulting in the production of zinc oxide and a chloride of the alkaline earth, or alkali soluble in water. He then separates the soluble substances from the insoluble zinc oxide by treatment with water. Otherwise, instead of heating the mixture as described, he boils it in water and obtains a similar result, when after allowing the zinc oxide to subside he draws off the water containing the soluable substances, and washes the zinc oxide with water to separate more thoroughly the soluble impurities therefrom. After the production and purification of the zinc oxide by either method it is dried for smelting or other purposes. The compounds of ammonia given off during either process may be utilised. Those of the carbonates which are insoluble in water are not so effectual or convenient in the boiling process as in the heating process.

PUMPING MACHINERY.—Some improvements in that class of rotatory pumping machinery wherein a cylindrical boss rotating within, but eccentrically to a cylinder, drives pistons radiating from the axis of and radiating concentrically with such cylinder have been patented by Mr. E. FIELD, of Chandos Chambers, Adelphi. The cylinder is placed horizontally; it is constructed with tangentially arranged induction and eduction ports of equal length, located opposite to each other, the induction port being at the top, the eduction at the bottom. These ports are narrow in proportion to their length, which is in the direction of the cylinder's circumference, to which they are so proportioned that the two portions of the circumference of the cylinder located between the ports shall be all but covered by the space intervening between any pair of pistons whenever that pair shall arrive between the two ports. Between the periphery of the boss and the inner circumference of the cylinder, where they most nearly approach each other, a space is established to allow foreign matter to pass without jamming the boss and pistons. The pistons are packed with L shaped leathers. Motion may be communicated to the shaft from the prime mover in the usual way. In some cases nicely balanced cranks are fixed to the ends of the driving shafts, the crank arms being bored with dead holes accurately screwed, so as to screw on to the ends of the shaft, which fit against the dead ends. In some cases the piston rod guides are made to form stretchers or holding frames. When using an air vessel its passage is so arranged as to strengthen the cylinder where most needed.

IMPROVEMENTS IN PUMPS.—A pump constructed according to the invention of Mr. J. N. ROWE, of Rockland, Maine, consists of a box or castings from which leads the suction pipe or pipes. The top of the box is formed by preference of two inclined planes having on their surfaces the suction valves of the pumps. Bolted or otherwise attached to this box is a cyindrical box. This cylindrical box forms the pump proper, and is set on the foot or suction box with its axis in a horizontal position. The lower half of the pump proper is divided into two chambers by a diaphragm, which diaphragm extends from the centre of the pump to the apex of the inclined sides of the foot box. Within the pump there is an oscillating or rocking plate, which has its axis coinciding with the centre of the pump, and is held in position and is oscillated by a shaft or king bolt, which has its bearings on each side of the pump, and is worked by suitible levers or handles. The oscillating or rocking plate is provided with a valve on each side, which valves communicate with the suction chamber of the pump, and act as delivery or discharge valves to the pump. The plate is also provided with a suitable leather or packing ring to form a packing between the plate and the sides and ends of the pump. The upper part of the pump is provided with a suitable delivery or discharge outlet, which when the pump is required for lift purposes only is left open, but when the pump is required as a force pump or fire engine this discharge outlet is closed. The pump becomes a force pump or fire-engine by the addition of a plate or flange, which cuts off the upper portion of the pump, and constitutes an air vessel of said upper portion. There is also a diaphragm, dividing the portion of the pump between the rocking plate and the said upper plate or flange into two chambers. The upper plate or flange is provided with two delivery valves opening from the said chambers into the top of the pump, being the air vessel. The said air vessel or upper portion of the pump is provided with a suitable nozzle or flange to which a discharge pipe may be attached.

SUBSTITUTE FOR GUNPOWDER.—The invention of Mr. JAMES MACNAB, of Charlotte-street, Fitzroy-square, relates to the employment of an agent, or agents, of a non inflammable and harmless nature as a complete and equally powerful substitute for gunpowder, guncotton, dynamite, or other dangerous explosives now used in mining coals, minerals, or blasting rocks, and which is also a most expeditious and cheap substitute for the present expensive, tedious, and laborious process of getting coal by manual labour or by cutting machines. His process and method consists of simple boring machinery, combined with bursting or explosive agents, and modified according to circumstances. The said bursting or explosive agents are generated by hydrostatic and pneumatic pressure in combination or separately—that is to say, water and air or other liquids and fluid are compressed or condensed in combination or separtely in a hollow iron shell, or other non-inflammable bodies acting in a similar bursting or explosive manner may be employed, but he prefers to use water and atmospheric air in combination for getting or mining coal.

HALLIDAY'S IMPROVED MECHANICAL STOKER.



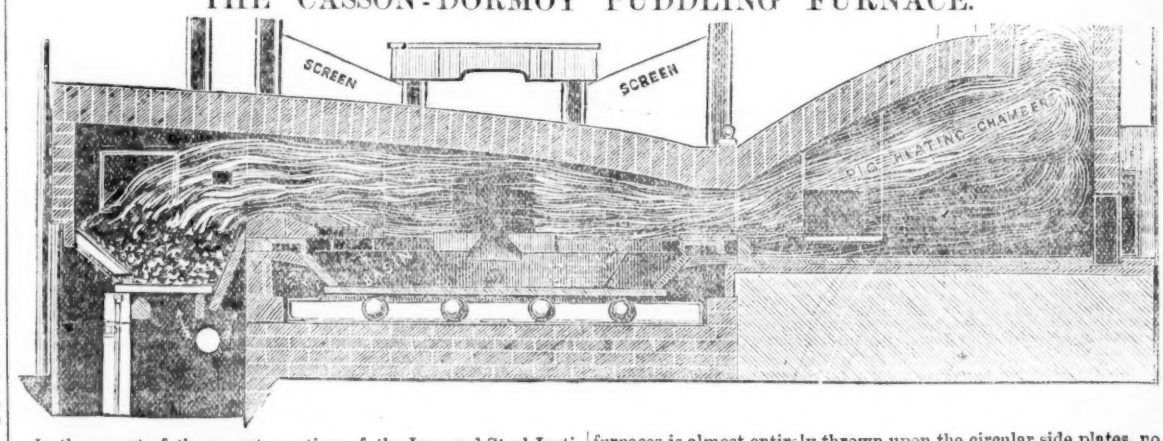
We had the opportunity of noticing the first of these mechanical stokers at work. They were then undergoing a sort of experimental trial, and were applied to one of five double-flued Lancashire boilers, in which position they had replaced another stoker construction, for reasons that it had been found that the fuel was not uniformly scattered over the whole furnace, so that this type was abandoned, and the mechanical stoker which we herewith illustrate substituted in its place.

In the boiler-house where it was working there were three boilers side by side, set in brickwork, and as the position of the boiler-house would not conveniently permit that the stokers should be directly driven from the engine, &c., a small vertical engine of 4½ in. cylinder was placed on the boiler brickwork to drive the whole six stokers as soon as they were fitted to the three boilers. A horizontal shaft placed above, and extending over the whole width of the boilers, was driven by this engine, and worked in its turn one of the upright shafts seen projecting out of the hopper in our illustration. These vertical shafts, one driving the other, serve to work the crushing rollers, fixed horizontally at the bottom of the hopper, and in addition have a small fan keyed on at the lower extremities. The sockets of these upright shafts are placed underneath the encasement in which the fans work, so as to be easy of access for lubricating purposes, and the speeds are so regulated that whilst the fans are working at 250 revolutions per minute the rollers make three-quarters of a revolution. The crushing rollers are furnished outside with expanding wheels, by means of which the distance from centre to centre may be increased or diminished—that is to say, more or less fuel is allowed to pass into the furnace according to requirements. A damper plate is, moreover, affixed to the stoker as an additional means of regulating or stopping the supply of coal to the surface. The action of this stoker is simple enough, for the hopper (with a capacity of 3½ cwts. of coal) being filled the coal is drawn between the crushing rollers, reduced to one uniform size, and as it is allowed to fall continuously at all distances from the centre of the fans, the coal is thrown in thin layers over the whole surface of the fires.

As the boilers in question were all of the same make we had a good opportunity of noticing the difference between hand stoking and mechanical stoking, although unfortunately no records had been kept by the boiler tenters referring to the consumption of fuel in both cases for the maintenance of a certain pressure of steam during a certain time. The dimensions of the furnace was given to us as 6 ft., fire-bars 9 in., dead plate 5 in. off the latter, and the throw of coal from this stoker, as we were informed, reached up to 7 ft. The hopper was charged in our presence with wet coal, yet we noticed no clogging up (as with other mechanical stokers known to us), but on opening the fire doors a continuous supply was going on. The boiler flues, where the stokers were applied, presented sheets of flame, whereas in the other two boilers at time of re-feeding the grate the flame was partially hidden by the smoke so created. A boy and a man were engaged in attending to these three boilers, and the steam pressure shown by the gauges at our departure was 59 with the stoker and 54 and 59 lbs. with the other two boilers.

As will be seen from the engraving this mechanical stoker is fitted to the boiler so as not to interfere with the usual method of firing, and although such stokers may by thus reducing the superficial area of the usual fire doors diminish the injuries done to boilers from the constant contraction and expansion of the plates resulting from the frequent opening of the fire doors, still, as the attendant is obliged to open these doors even when the mechanical stoker is applied, in order to regulate the supply of coal to the furnace and to assure himself of an evenly spread grate, we cannot but believe that this causes an admission into the furnace of a quantity of useless air, which tends to lower the temperature there. It must, however, be remembered that the proper admission of air into furnaces with the greatest exactitude is a problem not yet solved, but all improvements tending to this perfection must be welcomed, and in this sense we treat the mechanical stoker just described. A recent improvement which the inventor has introduced into this construction consists in the driving arrangement of the crushing rollers, or, more strictly speaking, of the upright shafts, to which we may again refer after we have had an opportunity of examining this improvement in practice.

THE CASSON-DORMOY PUDDLING FURNACE.



In the report of the recent meeting of the Iron and Steel Institute, published in the *Mining Journal*, reference was made to a paper descriptive of this furnace by Mr. E. F. Smith, of Dudley, and the above diagram is now given in order that the precise character of the invention may be better understood. In spite of the important results of this system—results not attained without the usual amount of experimenting—it is not claimed that all the separate features of the furnace present any thoroughly marked stamp of originality; the pig or heating chamber has probably been used before, though not, it is believed, worked in the method here adopted, nor in connection with a double furnace, and especially not with mechanical rabbling. The peculiar circular bed or basin is, perhaps, the most original, while it is also one of the most important characteristics of the furnace. By the absence of inequalities and corners, its shape does away with the difficulties usually attending the working of a mechanical rabble, at the same time effecting a considerable saving in fettling. Precisely stated, the following are some of the most direct advantages of the circular puddling basin—1. This circular form easily enables the rabbling to be worked by machinery, as there are no jambs that the rabbles cannot reach in their courses from right to left and back again.—2. The dimensions, as affected by the working, do not vary to any appreciable extent from day to day; this is an important point with all furnaces, but especially with furnaces in which the puddling is done by machinery.—3. The contours being circular, and the sides and bottom of the basin being kept free to expand, they scarcely ever crack. The only renewals are of the doors, door-frames, and bridge-plates.—4. As the strain of the furnaces is almost entirely thrown upon the circular side plates, no external or casing plates are requisite, thus permitting an economical construction of furnace. The buckstaves consist merely of old rails or similar bars.

The advantages of the preparatory chamber are—1. The saving of time in melting down, which in this case means a proportionate saving of fuel.—2. The pigs are free from the siliceous matter derived from the blast furnace pig-bed, and adhering to their surfaces. This sand is well known to be injurious to the bed of the puddling-furnace itself by wasting the fettling, and in other ways. The advantages of the peculiar grate are—1. The employment therein of blast, which can be regulated so that the furnace is under control, and the puddler can obtain either an oxidising or reducing flame at will.—2. The droop-doors and sloping back enable the underhand to prick the bars, and thus clean the grate without disturbing the blast below.—3. It permits the use of screened slack instead of forge lumps.—4. The sloping back grate, cooled behind with blast, prevents the formation of clinker. It would be difficult to exactly determine the indirect or contingent advantages contributed by each separate portion of the furnace, but it may be added that the increased efficiency of the reverberatory furnace has been found in practice to have the result of saving about one-half in fuel, fettling, castings, and bricks. Alterations in an old forge, in which it is wished to apply this system, can be made without interfering with its current work or its existing plant, whilst considerable space is gained for ventilation or other purposes, inasmuch as five of these furnaces will do the work of fifteen old single ones.

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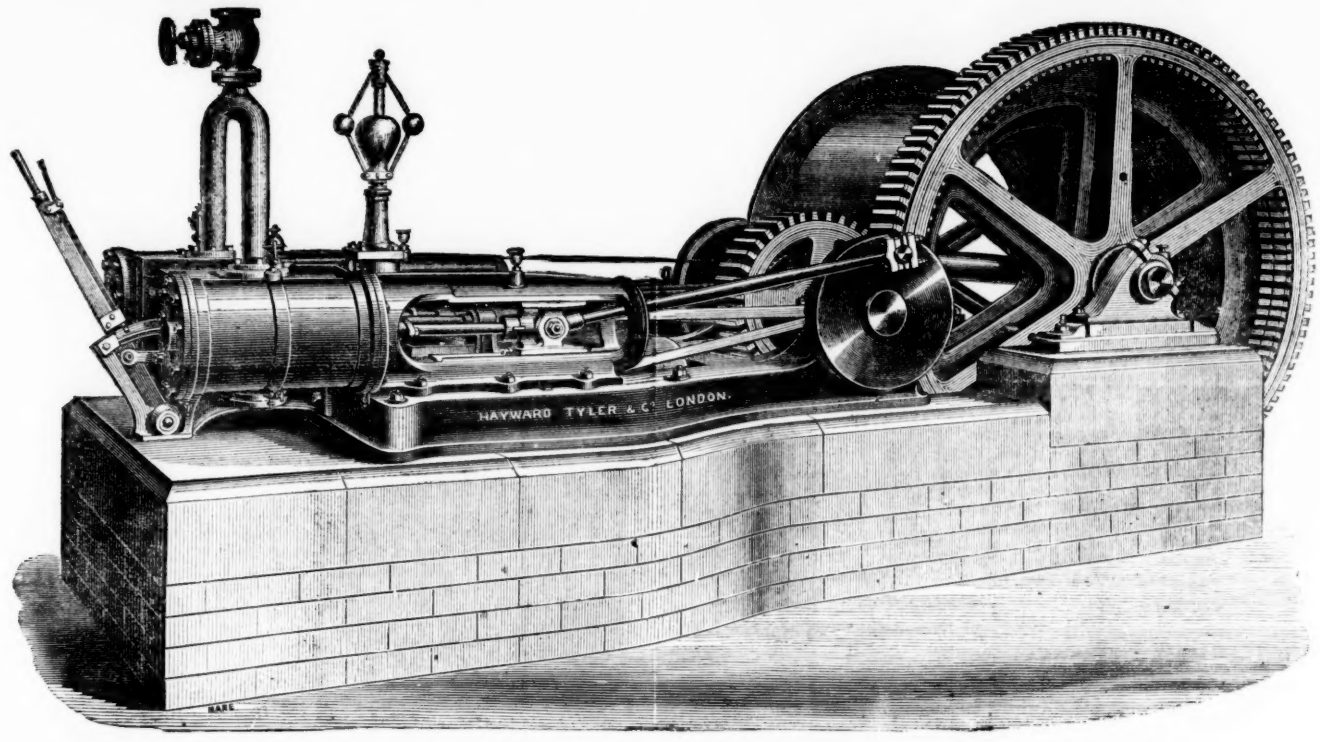

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1.—They are cheaper than any other kind in first outlay.
2.—Only about one-fourth of the space usually occupied by dressing-floors is required.
3.—From 60 to 70 per cent. of the labour in dressing, and from 5 to 10 per cent. of ore otherwise lost, is saved.
4.—They are the only machines that make the ore clean for market at one operation.

They have been supplied to some of the principal mines in the United Kingdom and abroad—viz.,

The Greenside Mines, Patterdale, Cumberland: London Lead Company's Mines Darlington, Colberry, Nanthead, and Bollyhope: the Stonecroft and Greyside Mines, Hexham, Northumberland; Wanlockhead Mines, Abington, Scotland (the Duke of Buccleuch's): Bewick Partners, Haydon Bridge: the Old Darren, Esgairmwyn, and Ystumtuen Mines, in Cardiganshire; Mr. Beaumont's W.B. Mines, Darlington; also Mr. Sewell, for Argentiferous Copper Mines, Peru; the Brattsberg Copper Mines, Norway, and Mines in Italy, Germany, United States of America, and Australia, from all of whom certificates of the complete efficiency of the system can be had.

WASTE HEAPS, consisting of refuse chats and skimpings of a former washing, containing a mixture of lead, blende, and sulphur, DRESSED TO A PROFIT.

Mr. BAINBRIDGE, C.E., of the London Company's Mines, Middleton-in-Teesdale, by Darlington, writing on the 20th March, 1876, says—"The yearly profit on our Nanthead waste heaps amounted last year to £600, besides the machinery being occupied for some months in dressing ore-stuff from the mines. Of course, if it had been wholly engaged in dressing wastes, our returns would have been greater: but it is giving us every satisfaction, and bringing the waste heaps into profitable use, which would otherwise remain dormant."

Mr. T. B. STEWART, Manager of the Duke of Buccleuch's Mines, Wanlockhead, Abington, N.B., writing on 20th March, 1876, says—"I have much pleasure in stating that a full and superior set of your Ore Dressing Machinery has been at work at these mines for fully a month, and each day as the moving parts become smoother, and those in charge understand the working of the machinery better, it gives increasing satisfaction, the ore being dressed more quickly, cheaply, and satisfactorily than by any other method."

Mr. BAINBRIDGE, speaking of machinery supplied Colberry Mines, says—"Your machinery saves fully one-half on old wages, and vastly more on the wages we have now to pay. Over and above the saving in cost is the saving in ore, which is not much short of 10 per cent."

GREENSIDE MINE COMPANY, Patterdale, near Penrith, say—"The separation which they make is complete."

Mr. MONTAGUE BEALE says—"It will separate ore, however close the mechanical mixture, in such a way as no other machines can do."

Mr. C. DODSWORTH says—"It is the very best for the purpose, and will do for any kind of metallic ores—the very thing so long needed for dressing-floors."

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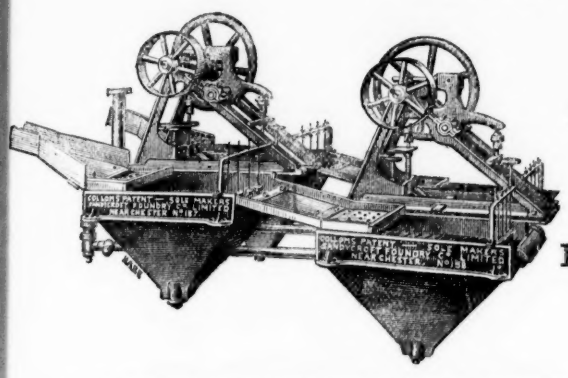

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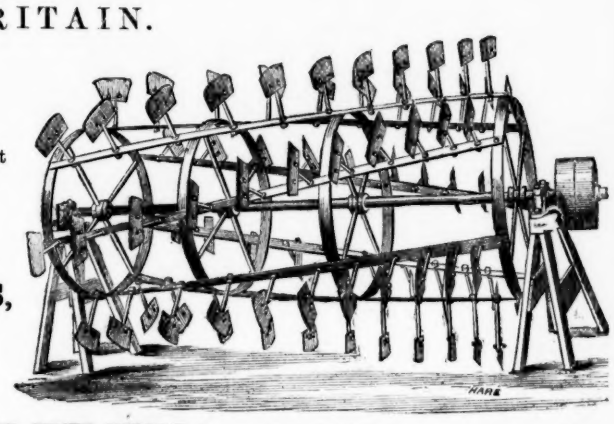

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CAUTION.—It having come to the knowledge of the Directors of this Company that certain unscrupulous persons are offering for Sale Rock Boring Machines as improvements on the "Burleigh" invention, and which Machines are Infringements of this Company's Patents, Notice is hereby given to intending Purchasers and Users that this Company will proceed at law against all Infringers of their Patent Rights, whether Makers, Vendors, or Users.

This Company Sell or Let out on Hire their **ROCK BORING MACHINERY**, or they Contract for the Execution of Rock Excavations, such as Shafts and Tunnels, by the aid of the "Burleigh" Rock Boring Machinery.

RICHARD MOTTRAM, Secretary.

EXTRACTS FROM RECENT TESTIMONIALS.

JOHN ROBINSON, Talysarn, near Carnarvon.

"The 'Burleigh' Rock Drills are working very satisfactorily, and I purpose adopting them throughout all my quarries."

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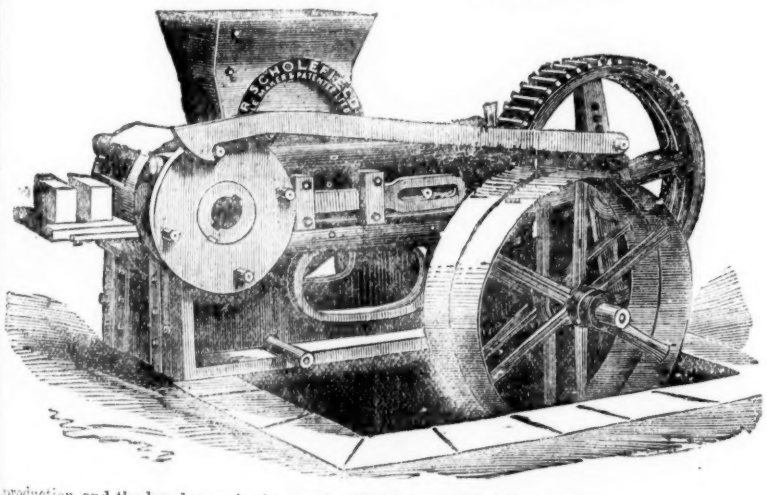

R. S. begs to call the attention of all Colliery Owners in particular to his PATENT SEMI-DRY BRICK MACHINE, and the economical method of making bricks by his patent machinery from the refuse that is taken from the pits during the process of coal-getting, which, instead of storing at the pit's mouth (and making acres of valuable land useless), is at once made into bricks, at a very small cost, by R. S.'s Patent Brick-making Machinery. If the material is got from the pit hill, the following is about the cost of production, and the hands required to make 10,000 pressed bricks per day:—

2 men digging, each 4s. per day	£0 8 0
1 man grinding, 4s. 6d. per day	0 4 6
1 boy taking off bricks from machine, and placing them in barrow ready for the kiln, 2s. per day	0 2 0
1 boy greasing, 1s. 6d. per day	0 1 6
1 engine-man, 5s. per day	0 5 0
1 man wheeling bricks from machine to kiln, 4s. per day	0 4 0
Total cost of making 10,000 pressed bricks	£1 5 0, or 2s. 6d. per 1000.

(SETTING AND BURNING SAME PRICE AS HAND-MADE BRICKS.)

N.B.—Where the material can be used as it comes from the pit, the cost will be reduced in digging.
As the above Machinery is particularly adapted for the using up of shale, bind, &c., it will be to the advantage of all Colliery Owners to adopt the use of the said Brick-making Machinery.

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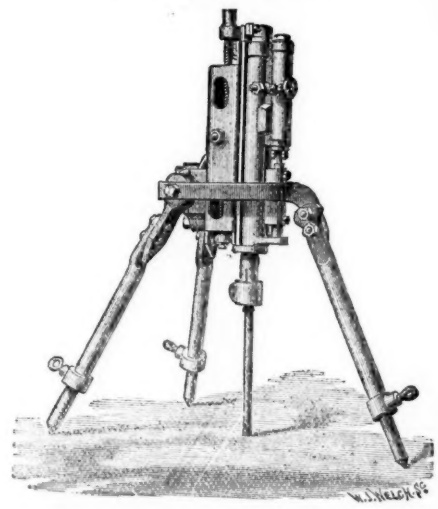

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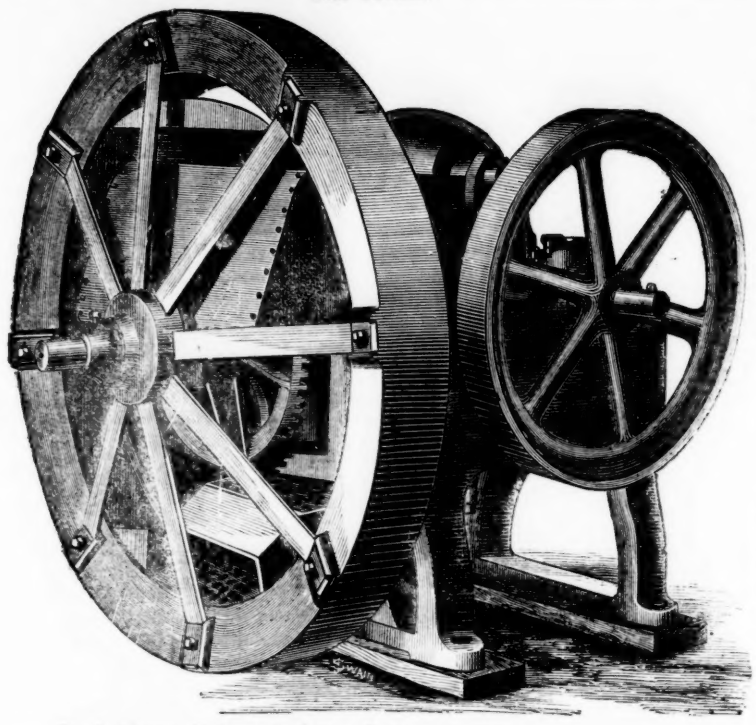

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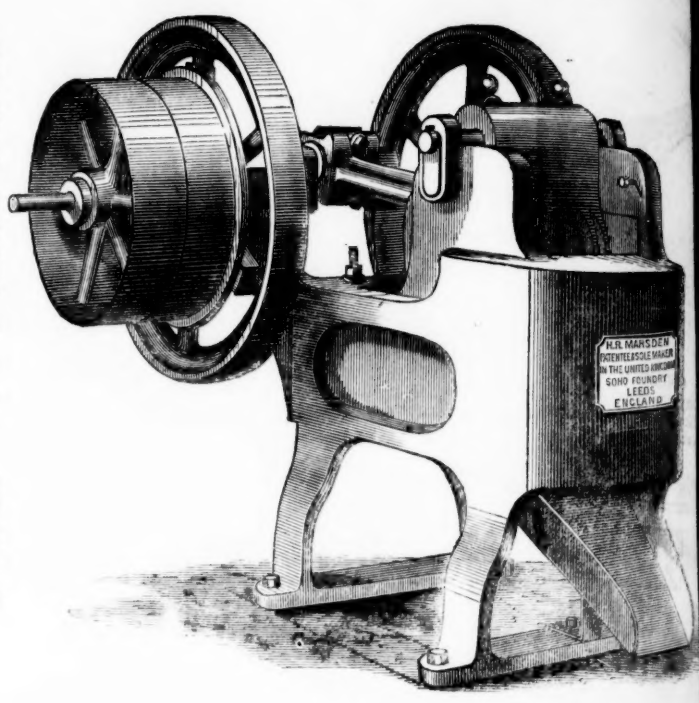

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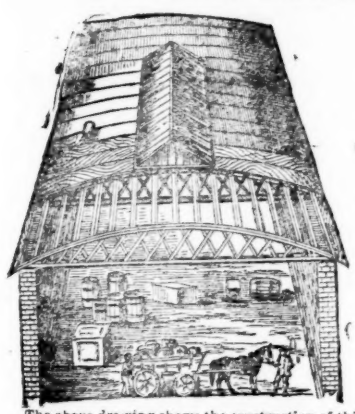

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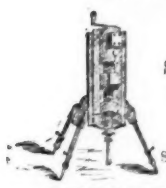

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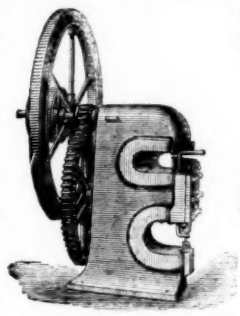

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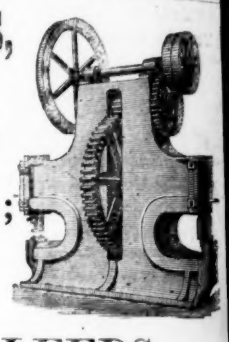

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Coal-Getting by Patent Hand-Worked Machinery,

WITHOUT THE USE OF GUNPOWDER.

No. 1 MACHINE - THE HAND COAL-CUTTER, for under-cutting.
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